JOURNAL

OF THE

FRANKLIN INSTITUTE

OF THE

State of Pennsylvania,

DEVOTED TO THE

MECHANIC ARTS, MANUFACTURES, GENERAL SCIENCE,

AND THE RECORDING OF

AMERICAN AND OTHER PATENTED INVENTIONS.

AUGUST, 1835.

Notice of an article in the "Boston Mechanic," respecting the decreased resistance to boats at high velocities.

TO THE COMMITTEE ON PUBLICATIONS.

GENTLEMEN,—In the June number of the Boston Mechanic, under the head of "Iron Boats," in accounting for the fact that boats, of a certain construction, when drawn at high velocities, require less force (in proportion) than when propelled at a slower rate, the writer lays down the following *principle*, to wit: "This is on the principle that the *forward velocity*, for the time being, *diminishes*, or rather counteracts the force of gravity, in the same manner as the centrifugal force does in the revolution of a circular body, or as the skater, when going swiftly, is able to pass safely over places where, if he stopped for a moment, his weight would inevitably carry him through the ice."

Now, this may be very plausible doctrine, but is not, in my opinion, according to established principles.

To say that the centrifugal force of a revolving body *diminishes* the force of gravity, is to say that a horizontal wheel, (a common top, for instance,) balanced in a pair of scales, would weigh less when revolving, than it would at rest; and the assertion that the forward motion of any body, in a horizontal direction, *counteracts the force of gravity*, is denying the validity of a well-established law of projectiles, viz: that any body, (a cannon ball, for instance,) projected horizontally

from an elevated position, will fall to the level of the earth in the same time that another body, let fall from the mouth of the cannon, would reach the earth. In other words, two balls, leaving the cannon's mouth at the same instant,—the one discharged in a horizontal direction, with any given velocity, and the other suffered to fall by its gravity alone,—would always maintain an equal elevation, so long as they remain unobstructed in their progress.

I apprehend that, in the case alluded to, the lightness of the boat at high velocities is due to the *relative* motion of the *boat and water*, and that it is perfectly immaterial whether the boat moves over the water, or the water passes under the boat, in which latter case the rising of the boat could not be very properly attributed to the "counteraction of gravity by its forward motion."

The example of the skater has not supported the position of our author, for it must be remembered that ice is usually supported by water, for the displacement of which, *time* is requisite; besides, if unsupported by water, *time*, proportionate (inversely) to the degree of pressure, would be required to part it.

Who has not witnessed the gradual giving way of timbers, ropes, and other substances, by the continued action of uniform pressure?

Respectfully,

R. Tyler.

Reply to a Question in regard to the Use of the common Thermometer, for ascertaining the Temperature of the Hot Air Blast for Iron Furnaces.

TO THE COMMITTEE ON PUBLICATIONS.

Gentlemen,—An inquiry having been addressed from very respectable iron masters, in regard to the use of the mercurial thermometer as a measure of the temperature of the hot air thrown into blast furnaces, I beg leave to reply, as requested, through the pages of your Journal.

By reference to the reports of MM. Gueymard and Dufrenoy, translations of which have been given in this Journal, it will be seen that the air thrown into the furnaces, the operations of which are referred to by them, varied in temperature, in different cases, from about 300° Fah. to 612° Fah. As mercury boils at 656 Fah., under atmospheric pressure, the vapour which will fill the part of the instrument above the mercury in the stem, will not begin to exert a force, unbalanced by atmospheric pressure, to burst the tube and bulb, until the temperature rises to that point. The common thermometer is, therefore, entirely applicable, for practical purposes, to all lower temperatures. In fact, if the bulb were not made very thin, the instrument might be used for such purposes considerably above this temperature.

To apply the common thermometer conveniently, the bulb should project below the scale, and if high temperatures are to be measured,

without endangering the instrument, it should have a range of scale somewhat above the highest.

A very convenient mode of applying the instrument, would be to insert an iron tube, say a piece of gun barrel, closed at the bottom, and open at the top, so as to fit a hole made in the upper part of the air-pipe, through which the hot blast is passing, this tube to pass down to the middle of the pipe. Into this, mercury being poured, and the thermometer dipped into the mercury, the temperature of the air within the apparatus can be ascertained at any moment, and then the thermometer removed from danger of accident. In such a case, unless the bulb is thin, great care is necessary, in reintroducing the instrument, to prevent its fracture, and, at all events, particular pains should be taken that no moisture is upon the bulb, when it is first dipped into the mercury.

An alloy of tin and lead may replace the mercury at high temperatures, and one of tin, lead, and bismuth, might be used as low as 210° Fah., without preventing the removal of the thermometer. Olive, or whale, oil will answer to quite a high range, and will be found convenient even above 400° Fah. Even when the instrument is not to be removed, this mode of arranging it prevents leakage at the joint through which the instrument passes, and danger of fracturing the tube in tightening the packing.

As a substitute for this tube arrangement, a thin sheet-iron cup, fastened by clay on the top of the air pipe, and containing mercury, or some substitute for it, will give, by a thermometer dipping into it, an approximation to the temperature of the air within.

In conclusion, we would observe that, if our friends in the interior use the hot air blast, only at 200° Fah., they are far from realizing the good effects which it is capable of producing; they would not be fully obtained by going 100° higher.

Should any further information, in reply to the question in hand, be desired, the same channel of communication will afford all that is in the possession of,

Yours, respectfully,

* * *.

COMMITTEE ON INVENTIONS.

Report of the Committee on Inventions, of the Franklin Institute, on the Trough Rail invented by S. V. Merrick, of Philadelphia.

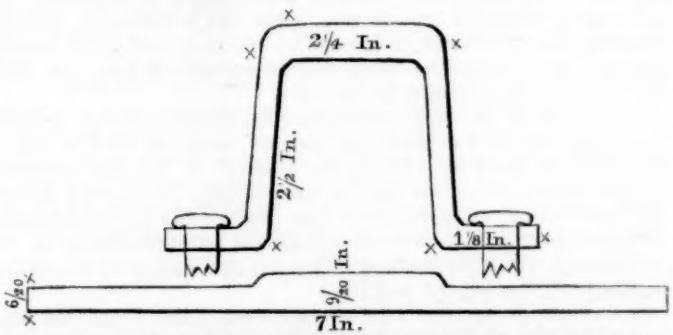
The Committee on Publications having learned that some question has been raised as to the correctness of a note appended to Mr. Strickland's report, published in the April number of this Journal, (see vol. xv., p. 228,) deem it an act of justice, both to Mr. Merrick and to themselves, to publish the annexed report of the Committee on Inventions, presented to the Institute in December, 1831.

The publication of this report has been delayed until the present time, in consequence of the paper and drawings having been placed,

for examination, in the hands of D. B. Douglass, Esq., Civil Engineer, by whom they have been but recently returned to the Institute.

The drawing of the rail described in the following report, was submitted, by Mr. S. V. Merrick, to the Committee on Inventions, July 25, 1831. COM. PUB.

The Committee on Inventions, to whom was referred the examination of a method of forming iron rails for rail-roads, presented by Mr. Samuel V. Merrick, of Philadelphia, REPORT:—



That the method under consideration contemplates the construction of rails in the form of a trough, two and a half inches deep externally, and two and a quarter inches wide at the base which forms the top, or bearing surface, of the rail, and two and a half inches wide at the part which rests on the chair.

Each edge of the trough is turned over into a flanch, one and an eighth inch broad, and having the extreme edges four and a quarter inches apart. This gives the expansion of the trough one-fourth of an inch in the course of its depth, tending to brace it laterally. The flanches serve to support and steady the rail, and to receive the bolts which are to fasten it to its appropriate bearing. The trough is thus inverted, when placed in its seat, and the wheels of the car run on what would be its bottom, when in the erect or natural position.

It is proposed to form this *trough rail* by first rolling a bar of iron seven inches wide, and three-tenths of an inch thick, except a portion two and a quarter inches wide along the middle, where it is to be $\frac{45}{100}$ths of an inch in thickness, passing it between grooved rollers, adapted to reduce it into the peculiar form already described. There appears to the committee but little doubt that a rail of the form and dimensions here presented, would be found abundantly adequate to the purposes for which it is designed; the only questions are, *first*, the practicability of reducing bars into that form, with a preservation of necessary accuracy; and, *second*, the weight of the bar, compared with rails of other forms already in use. There will probably be found little difficulty in rolling iron of this form, when we consider the

numerous and various figures which bars are already made to assume, under the powerful action of the rolling mill, and by knowing the exact weights of English rails of different descriptions, we are enabled to make a calculation and comparison of those rails with the one now proposed.

A transverse section of the rail under consideration, will measure 2.41875 square inches; consequently, a rail 15 feet long would contain $2.41875 \times 180 = 435\frac{3}{8}$ solid inches,

Rolled iron has a specific gravity of 7.77, and the cubic inch weighs $4\frac{49}{100}$ ounces avoirdupois, so that a rail 15 feet long would weigh $435.375 \times 4.49 = 1954.22775$ ounces, or $122\frac{55}{100}$ lbs.

By reference to several rails described by Mr. Wood, in the recent edition of his treatise on rail-roads, it will be seen that wrought iron rails used in Great Britain, are formed to weigh from 157 to 196 lbs. to the length of 15 feet. Hence it appears that, even with an increase of more than one-half in the area of its section, this rail would be still lighter than the heavier English rails.

By order of the committee.

WILLIAM HAMILTON, *Actuary.*

Dec. 12th, 1831.

FRANKLIN INSTITUTE.

Monthly Conversation Meeting.

The eighth conversation meeting of the Institute, for the season, was held at their Hall, May 25th, 1835.

Mr. Titian R. Peale exhibited a model of Redheffer's "*perpetual motion,*" the moving power being a spring concealed in one of the columns supporting the machine.

Messrs. Benjamin Slater & Co. exhibited a governor for a steam engine, invented by N. Scholfield, of Montville, Conn.

Mr. Isaiah Lukens showed a large magnet, belonging to Mr. F. Peale, arranged for obtaining the shock upon the plan described by Prof. Emmett,* the magnet being part of the electrical circuit. The shocks were unpleasantly strong, being about equivalent to those of a half pint Leyden jar, fully charged.

Mr. John Skirving submitted to the examination of the meeting, specimens of needles, in their various stages of manufacture, from the wire to the finished needle—also, the tools by which they are made—and explained the process of making them.

Mr. J. K. Smith, of Pottsville, Pa. exhibited a model of a rail-road car, provided with self-acting brakes, of several different constructions. These brakes are intended to take effect when one car strikes another, preventing thereby the serious accidents which have occurred by the breaking of the axle of one of the train of cars, by the locomotive running off the road, &c. This brake has been submitted, for examination, to the Committee on Science and the Arts of the Institute.

* Silliman's American Journal of Science, vol. xxiv., p. 78.

Messrs. Sergeant & Bashford, of Brooklyn, New York, exhibited specimens of handles for copper kettles, &c., pressed from rolled iron, which were well finished, and of good form.

Mr. Jonas Colburn exhibited and explained a mortising machine, invented by Mr. George Page.

COMMITTEE ON SCIENCE AND THE ARTS.

Report on Mr. Thomas S. Ridgway's Smelting Furnace.

The Committee on Science and the Arts, constituted by the Franklin Institute of the State of Pennsylvania for the promotion of the Mechanic Arts, to whom was referred for examination, the model of a Furnace for smelting iron, by the use of anthracite coal as fuel, invented by Mr. Thomas S. Ridgway, of Pottsville, Schuylkill county, Pennsylvania, REPORT:—

That they have carefully investigated the peculiarities in the structure of the model submitted to them; they have likewise reflected upon the theoretical views entertained by the inventor, regarding the supposed operation of a furnace upon the plan proposed.

The characteristic feature in Mr. Ridgway's furnace, is the possession of three combined stacks in lieu of one, the two lateral stacks being designed to receive the materials, and to retain them until they shall have undergone a certain supposed change; after which, they are to be transferred to the lower part of the central stack, to receive the direct action of the blast.

The middle stack is to be filled, to a small height only, with the substances for fusion, while the lateral stacks are intended for a twofold action, to relieve the fusing materials from the load of matter usually above them, which burden, by compressing together the smelting mass, he conceives to operate as one of the chief impediments to success, in the reduction of iron by anthracite coal. The other end to be accomplished by the side stacks, is that of preparing the ore for its final reduction, by keeping it at a moderate temperature, and promoting the chemical process, of purifying and carbonizing the ore, and assisting the action of the flux.

There are doors at the bottom of the side stacks, for the purpose of taking out the ore and coal after these preliminary changes, and transferring them to the smelting fire at the bottom of the central stack.

Doors of communication, furnished with valves, between the bottoms of the side stacks and the central stacks, permit the introduction of the draft from the fire into either, or both, of the side stacks. It is intended thus to effect a change in the ore in these lateral stacks, by bringing in contact the carbonaceous gas from the fire, and by excluding, as in the common furnace, the materials from access of oxygen.

In reviewing these ideas of Mr. Ridgway, the committee think that it is by no means proved that the cause of failure in attempts to smelt by anthracite coal, has been the pressure of the burden of the furnace upon the materials in fusion. The slope of the boshes of a

furnace may be such as to relieve the melting matter from nearly all pressure by the burden above.

In the next place, the committee are not convinced that any materially beneficial effects can be supposed to arise from the transmission of the blast or draft through the ore and fuel in a separate stack, which would not result in a stack of the ordinary construction. On the contrary, the loss of temperature incident to the causing the draft to quit the central stack, will, in all probability, prove rather prejudicial. They would, moreover, state it as their conviction, that the chemical views implied in the communication of the patentee, are wholly unsound.

He seems to expect important chemical changes to take place from the passage of carbonaceous matter in a gaseous state through the ore. Before it can be shown that *any* such chemical reaction can arise, he must first establish at what temperature the substances in these lateral stacks can be sustained. There can be little doubt that it would be one far short of the *fluxing point*, and the committee conceive that it has not been proved that any important change can take place in the ore, until that point has been attained.

When this is effected, the carbon present with the ore is certainly as capable of completing the process, by deoxidizing the ore, as any carbonaceous matter in the gaseous state, elaborated in a separate chamber.

By order of the committee.

WILLIAM HAMILTON, *Actuary.*

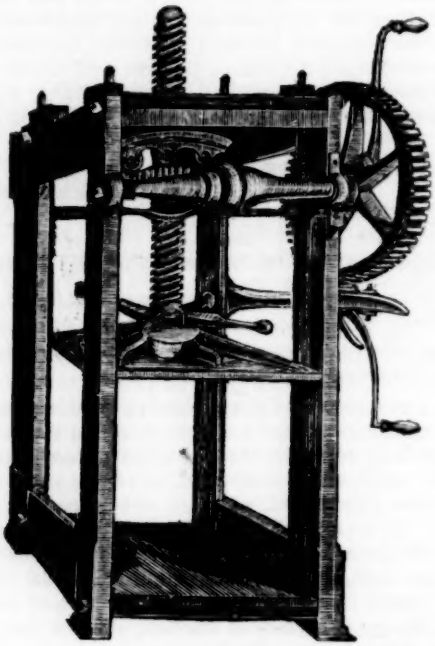
May 14*th*, 1835.

Report on Mr. Joel Barnes' Standing Press.

The Committee on Science and the Arts, constituted by the Franklin Institute of the State of Pennsylvania for the promotion of the Mechanic Arts, to whom was referred for examination, a Standing Press, invented by Mr. Joel Barnes, of Philadelphia, REPORT:—

That this press embraces the following combination of the well known simple machines, viz: a single screw in the centre of a cast iron frame, moving vertically through a nut or box in the upper part of said frame, which box is supported, when the press is not in use, on a cross plate below, and, when in action, is kept down by the upper head of the frame. To the box is attached a toothed wheel, of cast iron, on the upper surface of which, continuous with the surface of the box itself, is placed a circuit of ellipsoidal friction rollers, kept in their places by a flanch on a movable ring of iron, and playing between the upper surface of the box, and the under surface of the top plate of the frame. By the arrangement thus far described, it will be perceived that the screw may rise and fall by revolving on its own axis, carrying with it the platten, attached to its lower extremity, by means of a knob, or head, of well known application. The screw is made to revolve by four arms, fastened to the body thereof, just above the platten. With this arrangement, the machine, in point of action, differs in no respect from the common screw press, but may be quickly turned in either direction, involving no

serious loss of time in bringing the platten to and from its work. When, however, the pressure becomes too intense to allow the workman longer to turn the screw, the arms just mentioned are made stationary by a plug, or plugs, set into the platten, and the box itself is turned by means of a horizontal tangent screw, applied to the toothed wheel already described. It is now that the friction rollers come into play, preventing, to a considerable extent, the resistance which would otherwise proceed from the action of the box against the roller in the top block, within which it plays. The axis of the screw has a winch of convenient length, by which it may be turned as long as that is found practicable; and it also carries a toothed wheel, which is capable of being acted on by a pinion of much smaller diameter, that may be thrown into gear at pleasure, and to which the winch may be then transferred. This third and last mode of giving motion to the press, is only required when extreme pressure is to be communicated.



The committee think the advantage of three rates of speed in this press, will commend it to the attention of manufacturers, who have often found cause to complain of the loss of time involved by the common hydrostatic press, with a single forcing pump, and equally so, by those screw presses in which the whole range of motion was to be effected by a comparatively slow process.

As the inventor does not confine himself to any particular scale of dimensions, we have not deemed it necessary to make a statement of the calculation applicable to the press which we have examined, further than to remark, that it multiplies the force applied 10,000 times, and, when operated on by a single man, capable of applying sixty-six pounds, may, exclusive of friction, apply a pressure amounting to about 200 tons.

By order of the committee.

WILLIAM HAMILTON, *Actuary.*

June 11th, 1835.

Report on Mr. Joseph Dando's System of Book-keeping.

The Committee on Science and the Arts, constituted by the Franklin Institute of the State of Pennsylvania for the promotion of the Mechanic Arts, to whom was referred for examination, a system of Book-keeping, practised by Mr. Joseph Dando, of New York, REPORT:—

That Mr. Dando has presented four books, which are intended to effect a system of book-keeping by double entry, without the numerous *postings* required by the old Italian method. The chief novelty is to be found in what Mr. Dando styles a Journal of Settlements, which takes the place of the nominal accounts in the leger, and enables a good book-keeper to establish the correctness of his books in an easy and expeditious manner. The committee are of opinion that this system might be advantageously introduced into many establishments, where the long and tedious method of the old Italian system, or the ordinary system of single entry taught in the schools, is used, and cheerfully recommend it for the patronage of those who desire a certain and speedy process for keeping their commercial records.

By order of the committee.

WILLIAM HAMILTON, *Actuary.*

June 11th, 1835.

AMERICAN PATENTS.

LIST OF AMERICAN PATENTS WHICH ISSUED IN JANUARY, 1835.

With Remarks and Exemplifications, by the Editor.

1. For a *Stove for Cooking with Anthracite Coal;* Abraham D. Spoor, Coxsackie, Greene county, New York, January 7. (See specification.)

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2. For an improvement in *Stoves for Burning Anthracite, and other Fuel;* Abraham D. Spoor, Coxsackie, Greene county, New York. First patented March 15th, 1834; patent surrendered, and reissued upon an amended specification, January 7.

We gave an account of this stove at p. 200, vol. xiv., and made some remarks respecting what we considered as defects in the speci-

fication, and these it has been the design of the amended specification to cure. Since that period, we have had an opportunity of testing this stove, and have found it to answer the purpose intended admirably well. The draught of heated air is directed downwards along the front, and then backwards along the lower part of the stove, whence it ascends to the pipe, heating, in its passage, the lower part of the stove, which renders it very comfortable to the feet, whilst, at the same time, before the heated air reaches the pipe, a more considerable portion of the heat is given out into the room, than is usually the case, and thus admitting the employment of a short pipe, without the great loss of heat generally sustained from that cause.

The subjoined quotation, including the claim, will afford a general idea of the particular construction of certain parts, to which we have not alluded in the preceding remarks.

"In the foregoing description, I have made known the manner in which I construct my stove, and in so doing, have necessarily included many things of which I do not claim to be the inventor; I, therefore, now proceed to state specifically in what my improvements consist, and they are as follows.

"I claim the use of a flat rotary grate, having protuberances on its upper surface for jostling the coal, and thereby separating the ashes, with the general arrangement and construction of the respective parts for sustaining, tilting, or rotating, the same, through an avenue in which the shaker is inserted, as described.

"I claim the internal reverberating flues, situated within the body of the stove, by means of which, whilst the fire is surrounded by brick, or other imperfect conductor of heat, the draught, or current of air, after it has passed through the ignited coal, is brought into contact with the principal portion of the interior surfaces of the metallic plates which form the exterior surface of the stove, being first conducted downwards, then backwards, and then upwards, and thus heating the lower as well as the upper parts thereof; combining the aforesaid reverberating flues with the opening in the diagonal plate, by which the draught may be at once carried into the smoke pipe during the time of igniting the fuel, or whenever the same may be desired.

"I claim the placing or locating of the transparent door above the burning fuel, instead of below, or opposite to it, as heretofore practised.

"I also claim the general arrangement and combination of the respective parts, by which the above named improvements are rendered effective, whether constructed precisely in the shape or manner described, or varied in any way in which similar effects are produced by analogous means."

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3. For a *Churn;* Iram Brewster, Schoharie county, New York, January 7.

There appears to be some novelty about this churn, but that, we apprehend, is its only merit. The description and drawing are both imperfect, and every thing like a claim has been omitted. Accord-

ing to our understanding of the thing, there is to be a vertical tub, as in the common churn, and within this, at a proper height from the bottom, a shaft, having a crank on each end of it, crosses the churn, and carries revolving dashers. Above the top of the churn there is a similar shaft, with two cranks, which shaft is to be turned by a winch. Pitmen connect the upper and lower cranks, so that, when the upper shaft is turned, the lower may likewise revolve, their gudgeons working in the side pieces of a vertical frame, which extends down to the bottom of the churn.

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4. For a *Thrashing Machine;* Luke Hale, Hollis, Hillsborough county, New Hampshire, January 7.

It is manifestly incorrect to pronounce a judgment upon what we do not understand, and we are, from this consideration, compelled not to condemn the machine which the specification before us is intended, but altogether fails, to describe. The claim is to "the manner in which the machine is arranged," which, it is to be hoped, very far excels that of the description.

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5. For an improvement in *Cook Stoves, for correcting the smell, and improving the quality and flavour of the articles cooked therein;* Eliphalet Nott, Schenectady, New York, January 7.

(See specification.)

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6. For *Applying Gum Elastic in Sheets, or Gum Elastic Cloth, to Vessels and Buildings;* George D. Cooper, city of New York, January 7.

The caoutchouc is to be used "to prevent vessels and buildings from leaking, and to preserve the crews of vessels from the effects of dampness caused by the salting of vessels."

We are told to take the material, and to "divide it and run it into sheets one quarter of an inch thick, and of such length and width as the owner or builder may elect, or else to import the sheets ready cast from Para, the place where the gum elastic is produced." These directions are more easily given than followed, and it would have been very satisfactory to have been told how to "run it into sheets" of the desired length, breadth, and thickness, without impairing its quality. To get such sheets made by the persons, and in the places, where the gum elastic is produced, would be no easy task; we, however, will suppose this to be done, or the India rubber cloth which is prepared in this country, by covering canvass on one or both sides with that material, to be substituted therefor, agreeably to the directions of the patentee; this material is to be applied "between the inner part of the ribs, and the inner planking; between the outer part of the ribs, and the outward planking; between the outward planking and the copper; and between the deck beams and the deck planking."

Particular directions are given for laying it on, which we need not

repeat. In covering houses, the sheets are first to be laid upon rough plank, uniting their edges by dissolved gum elastic, and then shingling, or slating, over the whole, "so that the roof, &c. is not only water tight, but air tight."

There is no claim made, but the thing intended to be secured by letters patent, is the interposing the gum elastic between the sheathing and other parts of vessels, and between the boards and outward covering of roofs. It may, no doubt, be very advantageously applied to some of the purposes designated, but in others the test of experience can alone determine its utility. Under shingles, for example, the retaining of the water may tend to rot them very rapidly; and it is not impossible that the agents to which it will be subjected when used under water, may operate upon it disadvantageously; it, however, is well worth the trial.

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7. For a *Self-regulating Combined Pendulum and Lever Power Engine;* Sidney Woods, Freeport, Cumberland county, Maine, January 7.

We had, by accident, taken up the description of the machinery, No. 14, before examining that of which the foregoing is the title, and to that article we refer, as containing opinions which are perfectly applicable to the plan before us, so far as mechanical principles and utility are concerned. The present patentee, after describing a combination of wheels, pinions, levers, weights, and a pendulum, claims the aforesaid "combination of levers and pendulum, from which results the power or effect described in this specification." It would be altogether a waste of time to attempt to explain this combination, as any one, although totally ignorant on the subject of mechanics, may at once direct the construction of a machine which will give quite as much power as that before us. He cannot possibly begin at the wrong end, or make any mistake in the combination, provided he does not aim at any improvement, but is content with equaling the patentee.

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8. For *Taking Measure for Coats, &c.;* Allen Ward, city of Philadelphia, January 7.

The specification of this patent enters too deeply for us into the science of coat cutting, and it is accompanied by nearly as many diagrams as are to be found in the first five books of Euclid; and after all the description given, there is not any claim made, and we are, therefore, left to the conclusion that this great work is, in all its parts, perfectly original.

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9. For a *Spiral Spring Churn;* Lewis Hinkson, Hallowell, Kennebec county, Maine, January 7.

This is a *very simple* contrivance, consisting merely in a plan for working the common dasher churn by means of the foot. The churn is to stand between two uprights, having a cross bar at top; the dasher rod is to be attached to a sliding frame, working between these up-

rights, like a saw frame; a rod descends from this frame, having a projecting piece on its lower end, upon which to place the foot, to bring the dasher down; and upon removing the foot, two spiral springs, fixed to the frame, raise the dasher. The claim is to "the application of the spiral springs, and the peculiar form and construction of the machinery for moving the dasher, as applied to this purpose."

We doubt much the approbation of the dairy-maids in substituting the foot for the hand, in this operation, as we think that the fatigue produced will be, at least, fourfold.

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10. For an improvement in the *Cotton Gin;* William S. Cooley, Norwich, New London county, Connecticut, January 7.

The improvement claimed under this patent consists in forming the ribs, or grating, between which the saws work in the common saw gin, of cast iron, and case hardening them; in all other respects, the gins are to be constructed as heretofore. The advantages stated to result from this improvement, are, increased durability and firmness; ease and simplicity of construction; perfect uniformity of shape, and a considerable diminution in their cost.

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11. For an improvement in the *Machine for Planing Boards,* patented by William Woodworth; Artemas L. Brooks, Lowell, Middlesex county, Massachusetts, January 7.

In Woodworth's machine, the boards are planed on one side only at one operation, but for many purposes it is desirable that both sides should be planed, and the boards reduced to a uniform thickness, as, for example, in preparing them for packing cases. The present patentee is the owner of a right to Woodworth's machine, and his improvement consists in passing the boards between two sets of revolving cutters, one above and the other below them. The lower set revolve in a sliding frame, affording an easy mode of adjusting them to the thickness of the stuff to be planed. The thing claimed, is "the employment of two cutter wheels for the purpose of planing both sides of a board or plank at the same time, in the manner set forth, employing a double belt, or any other convenient mode, for giving motion to the said cutter wheels."

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12. For a self-operating *Ink Distributor;* John Maxson, Schenectady, New York, January 9.

Various machines have been patented for the purpose of inking the form in the common hand press, without the aid of a second person; but, after a fair trial, they have generally been abandoned, as they are liable to get out of order, and do not execute the work as uniformly as by a roller boy. The machine before us is spoken of as though it had no predecessors, and the end to be attained, as though it had previously been unattempted, which, as we have already intimated, is incorrect. Considerable ingenuity is manifested in the plan before us, and the machine is sufficiently novel in its construction to maintain its claim to a patent, but we do not see in it any thing cal-

culated to obviate the objections which experience has shown to exist against those which have been tried. To describe it without the drawing, would be difficult, and would interest but few of our readers.

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13. For a portable *Press for Tobacco, Cotton, Hay, &c.;* Alexander J. Murray, Annapolis, Anne Arundel county, Maryland, January 9.

This press is intended to act horizontally, and the power employed is that of the screw. A frame is made, consisting of two parallel side timbers, framed into stout head blocks at each end. Between these side timbers, the hogshead to be filled with tobacco, or other receptacle, is placed upon a suitable cradle. A cylinder, called a false hogshead, of about the same diameter with the hogshead, is also placed upon the cradle; this false hogshead is to hold a sufficient quantity to fill the hogshead, when pressed. A follower is to be forced into the false hogshead by means of the screw, and this screw works in a frame which crosses from side to side, sliding upon the parallel side pieces, and capable of being fixed on any part of them by means of pins passing through holes, adapted to the purpose. When the screw has forced the follower down its whole length, the sliding frame, or block, which advances with it, is confined by means of the pins; the screw is then turned back, and a block, against which it bears, is advanced so as to make a new start, and this is repeated until the pressing is accomplished. The claim is to the general arrangement, as described.

We think that this press will be found to be inferior to several others already in use, and, indeed, that it will not answer the purpose for which it appears to be principally intended, the pressing of tobacco. This article requires to be laid in the hogshead with much care, and to be packed in successive portions, and very uniformly; how it is to be so laid in a horizontal cylinder, we do not perceive, nor do we believe that the power applied will suffice to pack the whole contents of a hogshead uniformly and firmly, throughout, at one operation.

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14. For *Machinery for Propelling Mills, &c.;* Obed R. Marston, Jana, Genessee county, New York, January 9.

This is a most absurd project, at least as absurd as the attempt at perpetual motion itself. The defectiveness of the specification, and the incorrect manner in which the oath is worded, might otherwise be subjects of regret, more especially the former; but as the whole thing is "less than nothing, and lighter than vanity," irregularity and inconsistency in the manner of presenting it are scarcely noticeable. The applicant swears the oath prescribed by law both to a citizen, and also to an alien; but even this double fortifying will be of no avail in the attempt to turn dross into gold.

"The machinery is put in motion and propelled by means of weights raised by tackle power and a windlass, regulated as to its motion by either air or water. The wheels are constructed on a scale of one inch to a foot, and the whole machinery upon the same plan. The

gearing to be made so as to answer the several uses and purposes to which the machinery is to be applied. The regulator is an empty barrel, with a leather stopper, so as to fix with certainty the motion and speed of the machine, by the means of air or water passing out of or into the receiver, through a tube. It is to be attached to the machinery by means of a pitman and crank, and the whole construction of the machinery to be made agreeable to the mode herewith sent."

The foregoing comprises the whole description, and the drawing represents seven wheels and eight pinions, regularly geared together, with a drum, or barrel, and windlass at one end of the train, to wind up a weight, and a crank and pitman at the other, working a piston in a cylinder, which is to be the regulator. We do not write for those who need any thing further to show the utter worthlessness of the whole affair.

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15. For a *Churn;* Francis Colton, city of New York, January 9.

This is an old affair, and the patentee does not claim it as new, but merely describes the manner in which he constructs it. There are two dashers working in one box, the dasher handles being moved up and down by two cranks upon a horizontal shaft above them, a winch being employed to turn the crank. This churn is called a double dasher churn,—a name which has been anticipated, as well as the thing itself.

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16. For an *improvement in the art of Manufacturing a Double Acting Cylinder Pump;* Phelps Mix, Germantown, Philadelphia county, Pennsylvania, January 9.

A double acting pump of the ordinary construction is described, but nothing is claimed as new in this instrument, the mode of manufacturing such pumps being, it seems, the invention of the patentee, and this consists in casting the parts of which they consist, in metal moulds, made so accurately that they may be put together without being further wrought. Block tin, zinc, or lead, in any proportions, are spoken of as suitable metals; a mixture of one part of block tin, to three of zinc, being preferred. The claim is to the "manufacturing the double acting cylinder pump, by casting it in parts in moulds perfectly finished, and so formed that the different parts may be easily put together by soldering and bolts."

We have more than once had occasion to remark upon a patent of this kind, and have expressed the opinion fully that it is one which cannot be sustained, as there is not any thing new either in the thing made, or in the mode of making it. The casting of syringes, pumps, and other articles of that description, in metal moulds, in a state ready to be put together, is altogether old; but it is assumed that double acting pumps have not been so cast, and, granting this to be the fact, if a patent can be sustained for it, it will follow that, for casting in sand from any pattern new in its form, a founder might obtain a valid patent,—an idea which, to us, appears most palpably absurd.

17. For *Spiral Window Springs;* Munson L. Stevens, Waterbury, New Haven county, Connecticut, January 9.

A tube containing a spiral spring, is to be let into the window frame, opposite to the edge of the sash, which tube forces out a sliding catch, which falls into notches on the edge of the sash, a roller being placed at the bearing point, to diminish the friction; on the outer end of the catch there is a thumb piece, by which to depress it when required. The claim is to "the application of the spiral tube, and the contracted and compact form of the spring and catch, as above specified." This we should view as a claim to the application of the spiral spring only, as the contracted and compact form make no part of the construction, but is merely a result of such construction. The specification, although describing a simple thing, is altogether laboured and obscure.

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18. For *Open Grates, and Stove Grates, for Burning Anthracite Coal;* Elias W. Newton, Middletown, Middlesex county, Connecticut, January 9.

The patentee calls his invention a sliding grate, that is, one which is capable of being made to traverse back and forth, so as to shake out the ashes; this is to be effected by resting the grate upon ledges, and allowing it room to play; a handle being attached to a rod, or pin, which passes through the side of the stove for that purpose.

In Nott's stove, the grate is made to rock, and in Spoor's, to vibrate in a horizontal curve, and in the present, with a sifting motion; we do not recollect that this last has been before made the subject of a patent, but we apprehend that there is not that substantial difference between the vibrating in Spoor's manner, and that now described, upon which to found a claim to invention. The present differs from Spoor's mode no further than was necessary to apply a vibrating motion to a square grate, whilst his, from the construction of the stove to which they are applied, is round.

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19. For an improvement in *Stoves;* Elias W. Newton, Middletown, Middlesex county, Connecticut, January 9.

By this improvement, it is said that "the heat, which has hitherto been in a great degree lost, may be applied to the boiling of water, and generating of steam for culinary and other purposes, while at the same time it increases the durability of the stove." It consists in casting the back of a stove hollow, so that a space of two inches, or thereabout, may be left between two plates, which thus form a boiler for containing water. Near the bottom of this reservoir, there is a tube, by which the water may be withdrawn, and at its top another tube, leading into a boiler, the top of which is on a level with it, so that water may flow freely from one into the other. The improvement is intended to be applied to stoves of various kinds, and the arrangement must, therefore, be changed, to adapt it to the construction of the stove employed. Neither this, or the former, specification contains any claim.

The same gentleman to whom this patent has issued, obtained one on the third of last month, (December, 1834,) for a hollow back to furnaces, stoves, and fireplaces, which he then distinctly claimed, see page 20. As there cannot exist, at the same time, "two valid patents for the same thing," the foregoing has been incorrectly obtained. It was probably the intention of the patentee to take a patent for an improvement, only, on his former plan; but this he has not done, as he has not set forth distinctly in what his improvement consists, separating the old from the new, and confining his claim to the latter, as the law requires.

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20. For a *Rake Tooth Machine;* Giles Dayton, of Blandford, Hampden county, and William Stedman, of Tryingham, Berkshire county, Massachusetts, January 13.

A mandrel, which may be made of wood, is so mounted as to run in collar heads, in the manner of a lathe mandrel. The end of this is bored of a proper size and depth for a rake tooth, the hole being made trumpet mouthed. Three cutters are fixed to operate upon the piece to be formed, one of them in the mouth part, one, of about three inches in width, in the straight part, and one beyond this, which rounds off the point of the tooth. The timber is cut into lengths of about five and a half inches, and rived into pins of about half an inch square; these, held in a clamp made for the purpose, are passed into the revolving mandrel; they are then reversed in the clamp, and passed in again, so as to round the part left in the first operation. About four or five thousand can thus, it is said, be prepared in a day.

There is no claim, and the whole machine is, therefore, patented; cutters of this kind have been before used in revolving mandrels, but still the particular adaptation of the apparatus to the purpose designated, is, if new, which we believe it to be, a proper subject for a patent.

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21. For an improvement in the *Rotary Steam Engine*, and an improved boiler for generating steam; Ethan Baldwin, city of Washington, District of Columbia, January 13.

We gave a brief notice of the rotary engine patented by the same gentleman, on the 28th of January, 1833, upon which this is said to be an improvement, but to us it appears that the present engine is as distinct from the former in its particular arrangements, as many of the rotary engines which have been patented, are from each other. It will be seen by turning to vol. xii., p. 31, that, in the former engine, folding valves were used to close the annular cavity, or chamber. In the present engine, the valves, four in number, are to slide into the body of a solid revolving cylinder, much in the manner of those in Bramah & Dickinson's, patented in England in the year 1790; the valves in the present instance, however, are each distinct in its operation, not being united with that which is opposite to it. These valves are to slide in and out by their own gravity, or rather, as we should suppose, they are to slide out by the centrifugal force under

which they will operate, in their rapid motion, and to slide in by the action of the curved part, called by the patentee a bulk head. Stuffing is spoken of as intended to be applied to the valves, but it is mentioned rather as a thing of experiment than of certainty.

We are in this, as in the former patent, left altogether to conjecture respecting what it was intended to patent, no part of the apparatus described being claimed, nor any distinction made between what is old, and what is supposed to be new. On this point, and some others, we refer to the concluding remarks made on the former patent, as indicating the opinion entertained by us of the present machine. We shall be glad to find ourselves in error, as we hail all real improvements, and, in the present instance, take a friendly interest in the success of the patentee.

The boiler described is, in its general construction, like that of Stevenson, as used in locomotive engines, but with certain specified variations. The fireplace is to be in the form of a semi-cylinder, and entirely within the horizontal cylinder constituting the boiler, its flat side being uppermost, and below the water line. Vertical tubes are to pass through the top and bottom of this fireplace, to admit water through them; and horizontal tubes, from four to six inches in diameter, are to be placed as in Stevenson's boiler. The top of the cylinder is to have flues of sheet iron extending along it, conducting the heated air passing through the tubes, back again to the front, and then again to the back of the boiler, before it escapes at the chimney; these, of course, heat the steam only. Many advantages are enumerated, which are expected to result from a boiler so constructed, that we are very apprehensive will never be realized; we think it liable to many objections, and among them would name the vertical tubes in the fireplace, and the large size of the horizontal tubes. There are some points noted by the patentee, for example, hooping the boiler to prevent explosion, which we have not room to introduce. As regards this boiler, as well as his rotary engine, the patentee has neglected to discriminate between the new and the old, having described the affair as though the whole was original, which is very far, indeed, from being the case.

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22. For an improvement in the *Nippers of Reed's Nail Machine;* Stephen Chubbuck, Wareham, Plymouth county, Massachusetts, January 13.

"This improvement consists in having the nipper to play upon a pin in the upright post through which it passes, and is therefore called a *joint nipper*, which admits of a vertical as well as horizontal movement." This improvement, the advantages of which are set forth, is said to be applicable to some other nail machines, and is claimed generally.

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23. For *Machinery for Propelling Saw Mills, &c. &c.;* Irby Jones, Natchez, Mississippi, January 13.

This is intended for a horse power, although we are told that steam

may be applied to it, and so indeed it may, and to almost any thing else, with equal advantage.

A circular rail is to be made, upon which a heavy wheel is to roll, being drawn round by a horse. A horizontal shaft, attached to this wheel, extends to the centre of the circle, and, by means of bevil gearing, gives motion to a vertical shaft. We do not now recollect more than two patents for precisely the same thing, although there are some others which are very nearly related to it.

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24. For machinery for *Breaking the Husk of the Coffee Berry;* Isaac Adams, Boston, Massachusetts, January 13.

This machinery consists of two horizontal plates of cast iron, the upper of which has an eye through it, and is surmounted by a hopper. These plates are to be furrowed, so as to break the husks with the greater certainty. The distance between the plates may be varied, in order to adapt them to berries of different sizes. The upper plate is made to revolve, motion being communicated to it by a shaft passing through the lower plate.

Another modification of the apparatus is mentioned and represented, in which, instead of the upper revolving disk, a wheel with arms, carrying conical rollers sustained upon springs, is made to revolve, so that the rollers shall bear upon and crush the husks, without breaking the berries.

We should suppose that common stones, and some of the hulling machines consisting of similar disks, furnished with asperities, would answer the purpose equally well with the first described apparatus. There are, in fact, machines so much like it, as to leave for it but little claim to originality, excepting as applied to coffee berries.

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25. For machinery for *Breaking the Husk of the Coffee Berry;* Thomas Ditson, Boston, Massachusetts, January 13.

This apparatus resembles many of the machines for hulling clover, and other seeds. The berries are to be put into a hopper, whence they pass between a cylinder and concave, covered with punched sheet iron; thence between another cylinder and concave, covered with wire cards, and, after this, between a vertical revolving and a fixed hollow cone, the former of which is covered with projecting nails, and the latter with punched sheet iron.

The patentee says, "I claim separating seeds, or kernels, from the husks, by the several operations and machinery above described, *in connection.* And, *separately,* I claim the invention and use of a cylinder covered with sheet iron, having holes punched in it, as herein above mentioned, for bruising or breaking in pieces, the outer shell or covering of the coffee berry. Also, the invention and use of a cylinder or frustrum of a cone, into whose inner surface nails are inserted, and which is surrounded by an exterior casting of sheet iron, punched full of holes, so that jogged edges shall be raised on the inner surface, for the purpose of scratching or rubbing off the inner husk of the coffee berry."

Cylinders and concaves, covered with sheet iron, have been so long known and used, that we do not see how they can now be called an invention. We think the claim would have been more safe, had it left off with the general combination.

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26. For a *Percussion Cannon Lock;* Robert Beale, city of Washington, District of Columbia, January 13.

The claim made will serve to show the intention of the patentee, which is absolutely to close the touch-hole, by holding the hammer down after the stroke.

"What I principally claim, is this said cleat, or catch, which, by the aid of the spring attached to it, closes over the top of the hammer simultaneously with the explosion, and completely prevents the reaction of the hammer. The reaction of the hammer in all the locks heretofore made, has formed the objection to the percussion cannon lock."

This lock has been, and is still, under trial, but we understand that some objections to it exist, which have not yet been obviated, although the inventor expresses his confidence that he will be able to remove them; should there be a final report in its favour, we shall gladly make the fact known.

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27. For a *Machine for Hulling Clover Seed;* Stacy West, Hartford county, Maryland, January 16.

Two cylinders are to be made of wood, say thirty inches long, and seven inches in diameter, and the surfaces of these are to be made rough by a covering of punched sheet iron, or otherwise; they are then to be placed in a trough, in which they are to stand parallel to, and nearly in contact with, each other, but inclined at an angle of about ten degrees with the horizon. Each of them has under it a semi-cylindrical concave, with its surface roughened in like manner. By means of a cog wheel on the gudgeons of each cylinder, they are geared together, so that, when the necessary power is applied, they will revolve towards each other. A cover fits on to the trough, and has a hopper at its upper end, to receive the seed to be hulled. Provision is made for adjusting the boxes in which the gudgeons revolve, so as to regulate the position of the cylinders.

The claim is to "the mode of working the machine, and the manner in which the cylinders are arranged." What is meant by "the mode of working the machine," we do not know, as it is intended generally to work it by means of a strap passing around a whirl.

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28. For a *Machine for Churning and Washing;* Ira Park, Delhi, Delaware county, New York, January 16.

A vessel in the form of a common churn, or in that of a barrel, is to be fixed in a frame, so as to revolve with its axis at an angle of about 45° with the horizon, there being a gudgeon on the centre of its bottom, and another on the lid, which lid is movable. There are to be projecting ribs on the inside of the vessel, extending from top to

bottom, in order to increase the agitation; these may project inwards about an inch.

There is not any thing new, either in the construction or the position of this machine, and the patentee has not preferred any claim.

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29. For a *Machine for the Cure of Dyspepsia;* Charles Wood, New Bedford, Bristol county, Massachusetts, January 16.

This machine consists of a table, or platform, upon which the patient is to stand, and where he is to take hold of a couple of handles, by which he is to work a swinging part of the apparatus backward and forward. This swinging part consists of two vibrating bars, which are attached, by pivots, one on each side of the table, their upper ends being united by a cross bar, forming the handles. The weighted lower ends are to rub or strike against certain obstructions projecting from the table legs, and by this means, "a sudden jerk will be given to the muscles of the arms and chest, thus exercising them in such a manner as to restore its tone to the stomach, and, of consequence, health to the patient."

There were in existence, before this patent was obtained, several machines adapted to the same purpose, which every one had the right, if they had possessed the disposition, to use. One of them is technically known under the name of a wood axe; another of them is denominated a saw, and there is a set of them called a maul and wedges. We have also heard of the application, in certain country places, of what are there known under the names of a hoe, and a spade, which are said to be very good stimulants and tonics. In the use of these, withal, it is believed that the result of the exercise is productive of other benefits, besides that accruing immediately to the patient. As in other chronic diseases, however, perseverance is an ingredient in the remedy absolutely necessary to its success; and if this be added by the patient, to the above mentioned applications, they will, we are assured, answer quite as well as the patent machine.

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30. For a *Cooking Stove;* Sylvester Parker, Troy, Rensselaer county, New York, January 16.

It is said in this specification, that the direct action of the fire upon the plate which forms the back of the furnace, and the front plate of the oven in the stove commonly called the "three boiler flat cooking, or jews' harp stove, soon destroys that plate, and is productive of other inconveniences; to obviate which, the present patentee, instead of casting the lower plate flat, makes it with a bend, or rise, in the form of an inverted U, crossing the plate just at the termination of the furnace, one side of this U forming the back thereof, whilst the other forms a part of the front of the oven. The hollow of this bend is thus exposed to the action of the external air, which prevents its undue heating. For the same purpose, a similar space is left between the upper part of the division between the furnace and the oven.

"What I claim as my invention and improvement in the above

described stove, is the mode of separating the furnace from the oven by the bend, or upward curve, in the bottom plate of the stove, as above described, so as that part of the back of the plate which is exposed to the action of the fire on one side, may be open to the air on the other, thereby preventing undue heat, and the consequent injury and destruction of the plate. And also preventing the front plate of the oven from coming in direct contact with the fire, as is the case in stoves of the ordinary construction, thereby preventing the undue heating and consequent injury of the oven."

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31. For a *Portable Stove and Culinary Heater;* John Iggett, Albany, Albany county, New York, January 16.

The body of this stove is to be made of tin, or of sheet or cast iron, lined with tin. The furnace slides in under the bottom, and over this there is a flue running either way along the bottom of the oven, then up through vertical pipes near each end, into a flat flue between the top of the oven, and the top of the stove. Above the vertical pipes are openings for kettles, and the heated air may be carried off by a common pipe in the centre of the top. The oven, or body of the stove, may be closed by folding doors. Several variations, both in form and substance, are described, very much at length, and many things are claimed individually, after which comes the following general claim.

"And the said John Iggett further claims the application of the inverted basin, or heater, box grate, heat and conducting pipes, rotary shaft and shelves, movable top upon the heater, the division of the oven into different apartments, and all and singular the various modes of constructing the same hereinbefore described, either with a round, square, oval, oblong, any and every shape, box or stove, heater, tank, vessel of any and every description, whereby the operation and action of the heat is the same as hereinbefore described." This is sufficiently broad and sweeping; but it is one thing to make statements in a brief, and another to sustain them by testimony.

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32. For a *Machine for Extracting Stumps;* Henry Gordon, Fountain Dale, Adams county, Pennsylvania, January 16.

A frame is to be made of stout plank, which is to be set up vertically near the stump to be raised, between parallel planks or timbers making a part of this frame; a long and stout lever extends in a horizontal direction; there are two rows of pin holes in the two cheeks of the frame, and the pins passed through these serve as fulcra for the lever, the pins being passed alternately through each cheek, in such a way that, by depressing one end of the lever, and raising the other, it will itself be made to travel up the frame, and to carry with it one end of the stump lever, attached to its centre by a suitable hook. The outer end of the stump lever is fastened to the stump by dogs, or otherwise, and this, as it is raised, rolls the stump over; or the outer end of the stump lever is to extend beyond the stump, and to rest upon a block, when, by raising it, the stump is drawn upwards. A second vertical frame is sometimes used, with a lever to

operate upon that first described, and thus, by their combination, to increase the power.

Machines of this description may be advantageously used in certain situations, but in most clearings, where the ground is heavily timbered, the stumps and roots would offer more difficulty to the farmer or planter when distributed over, than when in, the ground, as they would neither roll or burn.

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33. For a *Washing Machine;* Stillman Roberts, Portland, Cumberland county, Maine, January 16.

The body of this machine is to be in the form of a cross, with gudgeons in the centre, on each side of it. There is a full and particular account of it given, which ends with, "I claim as my invention, the standards on which the machine runs, and the *close* trunks or arms, and the fluted grooves, or bars, across the ends, together with the door for inserting, and taking from the machine, the articles to be washed." Which standard and door are precisely like a thousand others. We also, very lately, described a revolving box for a washing machine, in the shape of a cross, but this, though somewhat less old than the standards and door, is not claimed.

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34. For an improvement in the *Endless Band for a Horse Power;* Jonathan L. Stanley, and James C. Howard, Winthrop, Kennebec county, Maine, January 16.

A band is to be made of sole leather, and upon this the slats are to be fastened, upon which the horses are to tread. A system of cylinders and friction rollers, the gudgeons of which rest on the side pieces of the frame, are used to prevent the swagging of the endless band. The claim is to the "plan of making and using a band of *sole leather*, as above described, and also the plan or system of friction rollers, and cylinders for preventing the swagging of the endless band, and to diminish the friction of the drums, as above specified."

We should apprehend that the dirt and moisture which must pass between the slats, would be very troublesome upon the leather band, as this will effectually prevent their passing through.

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35. For a *Currying Knife Trimmer, and an improvement in forming the edge of the Currying Knife;* Luther Townsend, Farmington, Kennebec county, Maine, January 16.

This currying knife is to have one flat side, and to be beviled on the other, like the edge of a chisel, instead of being, as usual, beviled on each side. The edge is to be turned towards the flat side, which is to be made perfectly smooth, and is always to remain so. "The advantage of this alteration in the shape of the knife consists in this, that it requires the turned edge to be but half as long as in the common knife with two bevils. On this plan, an edge half as long will take a rank hold of the leather, will last much longer, and will cut abundantly easier, than on the plan in common use."

The trimmer is an instrument used to sharpen and smooth the

edge of the knife which is turned on one side. It consists of two plates of cast steel, fixed into a small wooden stock, by means of a wedge inserted between them, and so formed and placed, that, by drawing them over the edge of the knife, they turn a smooth edge thereon. A description of its precise form and use, would require more space than we can allot to it. We have no doubt that this instrument is a good contrivance for the intended purpose, but are unable to follow the patentee in his views, as regards his improvement in the form of the knife. We cannot see any difference in its action, whether beviled on one or on both sides. The bevil becomes a flat side by extending it to the back of the knife, and the angle of the edge may be the same, whether both sides, or only one, is beviled, and the effect produced by it must be the same in either case, although the position in which it is held must be varied; by a diagram, we could easily demonstrate the correctness of these observations, but hope that we may be understood without it.

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36. For a machine for *Cutting Sausage Meat;* James Burns, and John Walter, Waynesboro, Franklin county, Pennsylvania, January 16.

This bears the appearance of being a good instrument for the purpose intended, and it is certainly a very compact one. A hollow cylinder, closed at each end, has within it a revolving cylinder, or rather frustrum of a cone, extending from end to end. The meat is put into a hopper near one end of the instrument, and is discharged through an opening on the under side, near the opposite end. There is a system of fixed knives within the hollow cylinder, and upon the revolving cone are spirally placed studs, or wings, by which the meat is, in its passage, completely minced. The parts, as we have already intimated, are arranged with much skill. The claims are limited to those peculiarities in the construction, which, so far as we know, are new. A neighbour, who has tried the machine, was perfectly satisfied with its operation.

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37. For an improvement in *Trunks and Settees;* Benjamin Morris, New Richmond, Clermont county, Ohio, January 16.

The trunk and settee described in the specification of this patent, are designed principally for travellers in steam and canal boats. The trunk is made to fold up in a peculiar way, and the articles placed in it have compartments adapted to the special purpose of rendering them secure. The settee, which is in general intended to accompany the trunk, is so constructed that the latter may be safely stowed below it, the whole taking but little room. The settee unfolds, so as to be readily converted into a comfortable berth, furnishing its own mattress.

The upper part of the trunk encloses a thickness of cork, intended to give to it a degree of buoyancy in water which will sustain 180 lbs., thus fitting it not only to float with the property contained in it, but also to save its owner from drowning in case of accident.

The whole apparatus is described without any claim being made; all the arrangements, therefore, must be considered by the patentee as new. We would suggest that, instead of a mass of cork three feet long, two feet wide, and eight inches in thickness, there might be a hollow space, lined or covered with India rubber cloth; this would be at the same time both cheaper and lighter than the cork.

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38. For an improvement in the *Bee Hive;* Samuel Morrill, Dixfield, Oxford county, Maine, January 16.

This patent is taken for some variation of, and improvement in, the form of the hive contrived by the same gentleman, and described by us at p. 173, vol. xiv. In noticing that patent, we observed that the thing claimed was altogether old, that is, the formation of combs in vessels of glass. We do not think it necessary to detail the proposed variations in the form of the hive, as they are merely an extension of the principle upon which the hive was originally constructed.

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39. For *Heating Reverberatory or Puddling Furnaces, with Anthracite Coal;* M. Brooke Buckley, Pottsville, Schuylkill county, Pennsylvania, January 16.

(See specification.)

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40. For a *Bedstead Machine;* Aaron Stedman, Pittsford, Monroe county, New York, January 16.

This bedstead machine is intended to cut a right and a left handed screw on the opposite ends of bedstead rails, and also to cut female screws into the posts to correspond with them. The things claimed are, "First. The cast iron augers, with the cutters dovetailed into the same. Second. The boxes or plates accompanying the augers. Third. The caps upon the screw tools, to regulate the cutting of the screw. Fourth. The standards, or head block, and heel block, with the screws attached to the same. By means of these improvements, the screw in the ends of the rails, and the nuts or boxes in the posts, are always cut uniform, so that the bedstead will in all cases come together with close joints."

Bedsteads screwed together in the way proposed, are not so good as those furnished with good screws of the common kind, or as those that have some of the dovetailed wedge fastenings which have been patented. Notwithstanding the contrivances described by the patentee, screws formed of wood, on the opposite ends of a rail, will not uniformly strain up together. The patentee uses what he calls an auger, of cast iron, for cutting the female screws; this auger does not differ from the tools in use for the same purpose, unless the making them of cast, instead of wrought iron, is to be considered a patentable difference.

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41. For a *Machine for Bending Mast and Truss Hoops;*

Jonathan Mulford, Northern Liberties, Philadelphia, Pennsylvania, January 16.

A cylindrical pulley, or chuck, of iron, is fixed on to the end of a horizontal shaft, with which it is made to revolve, the shaft being turned by means of a wheel and pinion, operated on by a winch. A small roller, formed upon the end of a second shaft, parallel with, and directly above, the former, bears upon the pulley, or chuck, around which the hoop is to be bent, and is borne down upon it by means of weighted levers. The iron passed between these is secured to the chuck by passing under a staple, where it is fastened by a wedge. Upon turning the machine, the iron will be drawn in, and bent into a circular form.

There is not any claim made, and the machines for bending hoops, tire, and other articles, are so numerous, that the patentee certainly ought to have designated the character by which this machine is to be distinguished from others.

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42. For a *Machine for Shelling Corn;* Robert Gray, Northfield, Merrimac county, New Hampshire, January 21.

In this machine, the corn is not to be shelled by a revolving motion, as is generally done, but by passing it between rubbing boards, armed with iron teeth, formed by driving stout wires, or brads, into them. These boards stand vertically in a suitable frame, and one of them is to be worked up and down by a lever moving like a pump handle; whilst the other is borne up towards it by four springs, which adapt it to the size of the ear. The upper edge of the fixed board slopes out, to allow of the feeding of the corn from a hopper, or feed hole, above it. A riddle, below, serves to separate the corn from the cob.

"I do not claim as my invention, any of the parts of the machine taken separately, nor do I claim the performing of the operation of shelling and cleaning simultaneously, this having been before effected. But what I do claim, is the general arrangement and construction of the shelling part, consisting of the two shelling boards, lever, and springs, constructed in the manner, and operating upon the principle, hereinbefore described and set forth, without regard, however, to any particular dimensions or materials, or to the precise form given to the respective parts."

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42. For a *Grist Mill, or Conical Grinder;* Hezekiah P. and Pouncey Nuckolls, Barren county, Kentucky, January 21.

This is to be a cast-iron mill, and it is made so much like some others, that it would be no easy task to find the part in which its novelty lies. We are told that "the said conic grinder is suitable to grind all manner of grain, of which we claim to be the inventors, so much of it, however, as relates in a particular manner to the cone and runner, and their operation together, and no more." The patentees can, no doubt, see something peculiar in their conical nut and shell, but they not having pointed directly to it, we are unable to find it out.

43. For a *Saw for Sawing Staves, and other cylindrical work;* Harvey Holmes, New Marlborough, Berkshire county, Massachusetts, January 21.

The sawing is to be effected by means of a hoop saw, sustained upon friction rollers, in a way which we have had occasion to describe more than once; but the present patentee thinks that he has improved the apparatus, by causing the gudgeons of the friction rollers which sustain the saw, to run upon other friction rollers. He claims "the application of the second set of friction rollers, or wheels, for the journals or axles of the first named set of friction rollers, or wheels, to run or revolve upon their surface, to prevent friction, and thereby to accelerate the speed or motion of the saw, so as to enable more work or business to be performed in the same time, than by any other machine."

We know not in whom the right to the hoop saw vests, but if not in the present patentee, his so called improvement will not secure it to him. We are of opinion, however, that the additional friction rollers will involve more loss by their complexity, and the expense of their construction, than they will repay by diminishing friction. It will be found, in practice, that many of these wheels will stand still, and allow the gudgeons to revolve upon their surfaces, more especially when saw dust, or other foreign matter, adheres to them. For some preceding remarks on a saw of this kind, see vol. xv., p. 93, and vol. xiii., p. 121.

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44. For a *Machine for Cutting Straw;* Nimrod Murphree, Nashville, Davidson county, Tennessee, January 21.

In this machine, the patentee claims "the arrangement of the machinery in general, being, as I believe, both in form and mode of operation, entirely new." It consists of a wheel, which is to be made to revolve horizontally, and having a cutting knife upon its upper surface, extending from the centre to the periphery. Above the horizontal wheel, there is a vertical box, or feeding trunk, into which the straw is to be put, and some other appurtenances, which we do not think it necessary to point out, as nearly the whole of them may be found in our notice of a straw cutter patented in July, 1834, vol. xv., p. 96. We might allude to others, both of a prior and a subsequent date, which contain the same "arrangement of the machinery in general."

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45. For an improvement in the construction of *Water Cisterns;* Levi Kidder, city of New York, January 21.

The specification of this patent is made with all due attention to form, but this will not communicate value to that which is not intrinsically good, and such, we think, is the case with the invention before us. Where a cistern is to be made, we are directed to dig out an opening therefor in the ground, somewhat larger than it is designed eventually to be, say two feet in the horizontal dimensions. A mould of wood is then to be made of the intended size of the cis-

tern; this should be formed in sections, so that it can eventually be removed; it may be in the form of a jar, lessening at top. The earth taken out is then to be sifted, puddled, and pounded, and closely packed in all round the mould, adding clay or lime at discretion. This is to stand a sufficient length of time to become hard and firm; the mould is then to be removed, and the inside plastered with hydraulic cement.

The patentee does not claim the plastering with cement upon the earthy walls, or the use of gravel to harden the mortar. "But the claim of this applicant in respect to the construction of such vessels, consists, as aforesaid, in the mode or method above described, of forming vessels intended to be constructed to hold water, or other fluid, as aforesaid." Which claim falls very short of distinguishing the plan of the patentee from that of others.

Where the earth is compact, a better cistern would be made by merely excavating and plastering, and, in any situation, a wall of brick, well lined with cement, would be far better than one of earth, and it would be quite as cheap as that proposed.

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47. For machinery for the purpose of *Manufacturing Barrels;* John Squier, Selina, Onondaga county, New York, January 21.

This patent is taken for a system of machinery for manufacturing staves for dry barrels, such as flour, salt, lime, and plaster barrels. A large part of the operation is to be performed by means of circular saws, the mode of fixing and using which is described. The machine is said to consist of four principal parts, each of which is shown in the drawing, and referred to in the specification. Not a word is said respecting what the patentee considers as invented by him; he therefore patents the whole, and the originality of every part is certainly a very doubtful thing.

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48. For a *Press for Cotton, Hay, &c.;* Ebenezer Eliason, Jr., Fredericksburg, Spottsylvania county, Virginia, January 21.

This is a horizontal rack and pinion press, to be worked by horse power. The packing is to be effected at each end of the horizontal box, or frame, which is of suitable size for the bale to be formed. A vertical shaft rises from the centre of the box, and has a sweep on its upper end, to which to attach the horse; on the lower end of this shaft there is an endless screw, that turns a wheel on a horizontal shaft crossing the box; a pinion on this shaft mashes into a rack, which lies along the axis of the box, and has a follower upon each of its ends. Its construction and operation will now be understood, as there is not any novelty in the box itself. The claim is not well made out, being to "the manner of gaining power applied to pressing," and to "the manner of confining the screw between two cross pieces."

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49. For making *Truss Hoops;* Tristram Burgess, and Simeon Burgess, Livonia, Livingston county, New York, January 21.

This machine bears some resemblance to that noticed at No. 41, and is for a similar purpose. The hoop is, in like manner, to be bent round a cylinder, and, whilst bending, is to be pressed upon by a roller. It is not well described, the drawing is extremely imperfect, and there is not any thing claimed.

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53. For a *Fireplace;* Ansel Gerrish, Strapleigh, York county, Maine, January 23.

We are not quite certain that we have a correct conception of what the patentee intends to describe as his contrivance, although we have before us a drawing and description, with a claim attached to them; but the model is principally referred to, instead of the drawing. We think, however, that what is accounted the essence of the invention, is a flat funnel, pipe, or chimney of metal, to be used instead of the ordinary chimney, extending up from the throat of the fireplace. It is averred by the patentee, that he saves one-half of the fuel ordinarily employed, and accomplishes many other desirable ends. The insertion of his claim would throw but little light upon the subject.

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51. For *Separating Garlic and Smut from Grain;* Abraham Hurst, Allen township, Cumberland county, Pennsylvania, January 23.

This machine contains a series of riddles, cylinders, inclined planes, and a revolving fan, much like those used in other machines. One of the cylinders is to be covered with card teeth, and has a concave similarly furnished. We see but little of novelty in the parts represented and claimed, and nothing calculated to separate the garlic more effectually than it is at present done, which, unfortunately, is but imperfectly.

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52. For a *Thrashing Machine;* Alexander Porter, New Vineyard, Somerset county, Maine, January 23.

The claim is to "the wedge form and graduated projections of the teeth; and the cleaner is formed of long teeth, constituting a screen, or sieve, by one comb gradually projecting beyond the other." This is all we think it necessary to give.

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53. For a *Stove for Burning Anthracite;* Jacob J. Janeway, New Brunswick, New Jersey, January 27.

This stove does not differ, in appearance, from others which have preceded it, as it is represented in the drawing, which shows nothing more than its exterior, and is without written references; for its interior construction, we have, therefore, to depend solely on the description; a section certainly ought to have been furnished. The base of the stove is a square pedestal, forming the ash pit, as usual; this is surmounted by a cylinder, with its door for supplying fuel to the furnace part; a smaller cylinder succeeds to this, and then a third, still smaller, from which passes the smoke pipe. In the upper cy-

linder, and also in the stove pipe, there are valves, or dampers. In each of the lower cylinders, there are perforations to let out heated air.

"On the grate in the first cylinder are placed fire bricks, to secure the burning of the coal; on the bricks is set a cast-iron cylinder, of less diameter than the outer cylinder, surmounted by a segment of a cone of the same material, the opening of which is surrounded with an iron plate, that fills up the space between the opening and the external iron. In this manner a chamber is formed, from which, through apertures made for the purpose in the outer cylinder, heated air is let out into the hall, or entry."

"The inventor claims the construction of the chamber above described by the fire brick, the cast-iron cylinders, the segment of a cone of the same material, the iron plate that surrounds its mouth, and the external cylinders with apertures to let out the heated air. He claims, also, the application of a valve in the third section, or cylinder, of the stove."

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54. For an improvement in *Setting Awl Blades, &c.;* Erastus B. Bigelow, and Stephen P. Bringham, West Boylston, Worcester county, Massachusetts, January 27.

The awl, or other instrument, is to be inserted into a split socket, to which is adapted a ferule, by the sliding of which on to a conical swell at the end of the socket, the shank is held fast. The apparatus is well contrived for the purpose, but we apprehend that its complexity will render it too expensive for common use; we shall not attempt to describe the respective parts employed, which consist of five pieces of metal. There is no claim made, which must be considered as a defect, for although there is sufficient novelty in the general plan upon which to have founded one, the whole is not new; split sockets, for example, have been before used; still we think it probable that upon the general plan, the patent might be sustained.

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55. For a *Rotary Pump;* William C. Trowbridge, South East, Putnam county, New York, January 27.

Like the rotary pumps which have preceded it, this also is destined to an early oblivion, as the defects inherent to most of the plans of such machines, are not removed in this. The accurate fitting of the parts requires excellent workmanship, and the good effeect of this is soon destroyed by their wearing. The chamber of this pump is to be a hollow drum, or shallow cylinder, within which a wheel is to revolve; this wheel is to be scolloped out, leaving its periphery in contact with the interior periphery of the drum at four points, ninety degrees apart. The scolloped spaces between these form the chamber to receive the water. The drum is to stand vertically, and a supply pipe, furnished with a valve, leads from its lower edge to the reservoir. At the distance of one-fourth of the circumference from this, is the discharge pipe. There are certain provisions made, the description of which we omit, as we have given a general view of its construction, and think more unnecessary.

The things claimed are, the construction of the wheel; a valve, or break, used to direct the water into the discharge spout; and a cock in the supply pipe to let off the water.

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56. For *Paddles for Propelling Boats;* Philip E. Barbour, Louisville, Jefferson county, Kentucky, January 27.

This contrivance is, in effect, similar to several others which have been essayed both here and in Europe, but which have not, and are not soon, likely to supersede the paddle wheel. On each side of the boat there are to be two double cranks, the shafts of which are in the same plane, and these cranks in their revolution carry two horizontal bars, parallel to each other, each bar having bolted to it two or more paddles, which are caused to dip vertically in the water. The claim made is to "the application of these cranks, with their connecting bars and paddles, by a horizontal motion, to give a perpendicular dip to said paddles."

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57. For a *Mill for Grinding Grain*, called the "Farmer's Mill;" John R. Sleeper, city of Philadelphia, January 27.

(See specification.)

SPECIFICATIONS OF AMERICAN PATENTS.

Specification of a Patent for a Stove for Cooking with Anthracite Coal, called the Salamander Cooking Stove. Granted to ABRAHAM D. SPOOR, *Coxsackie, Greene county, New York, January 7th,* 1835.

Whereas, the want of sufficient flame, and the limited extent of the horizontal surface of the fire, in stoves for cooking with anthracite coal, hitherto in use, have made it difficult, if not impossible, to expose more than one or two boilers at once to the degree of heat necessary to carry on culinary operations to advantage; and whereas, it has been found difficult, also, in such stoves, to increase or diminish the fire suddenly for culinary processes: Therefore, be it known, that I, Abraham D. Spoor, have invented a new and useful improvement in stoves for cooking with anthracite coal, called the SALAMANDER COOKING STOVE, by which it is intended to obviate the above difficulties, and of which the following is a true and exact description.

The circular form, though not essential, being the best adapted to the arrangement that is to be made of the boilers, and other utensils for cooking, is the one that will now be described.

This stove consists of a hollow cast-iron cylinder, of from twelve to fifteen inches in height, placed vertically on a circular hearth of about double its diameter, both having a common centre. The grate is suspended within this cylinder, about midway between the base and top, and it may be adjusted for rest or motion; and the part

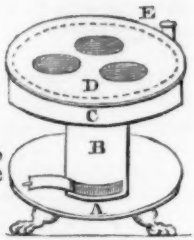
above the grate may be lined with brick, stone, or other non-conductor of heat. The ash drawer may be above or below the hearth, and should entirely close the entrance for air at the base of the cylinder. On the top of this cylinder is placed another hollow and concentric cylinder, of double the diameter of the lower one, or larger if required; this may be about six inches in height, and the lower plate of the upper cylinder has an opening in its centre, equal in extent to the top of the lower cylinder; and at the margin of this opening the two cylinders are joined together, and united into one common chamber. The upper plate of the upper cylinder, or the top plate of the stove, has several openings for boilers and kettles, and other cooking utensils, the openings for them being in such order and arrangement, that all of them, to the number of three or more, stand partly over, and are directly exposed to, the fire, and may, consequently, be kept boiling at the same time, thus avoiding the necessity of removing one after the other successively to the fire, or of giving a rotary motion to the plate in which they are contained, to attain the necessary degree of heat. For increasing the heat under either of the boilers, a further provision is made, by means of a flue within the periphery of the upper cylinder, to extend from the opening for the pipe both ways, so as nearly to meet in front, and encircle the stove; lateral outlets are made into this flue, opposite to each boiler, which outlets, or openings, are provided with dampers, to shut or open them as occasion requires. The opening, with a collar for the attachment of the pipe, may be on the outside of the periphery of the upper cylinder, and there should always be a damper in the pipe to regulate the fire. The baking, roasting, and other similar operations, are performed in separate bakers and roasters, of suitable construction, placed at proper distances around the lower cylinder of the furnace.

I claim as my invention and improvement, the drum, or upper cylinder, with the openings for boilers in the top, so placed in relation to the lower cylinder, or furnace, that all the boilers, to the number of three or more, shall be partly over, and directly exposed to, the fire, and so as to be kept at the required temperature at the same time; and also the circular flue, with lateral openings and dampers for directing the draught under either of the boilers when required, whether said flue be constructed within, or on the outside of, the upper cylinder; and the general arrangement and combination of the respective parts, so as to constitute a cooking stove, operating upon the principle, and in the manner, described.

A. D. SPOOR.

Spoor's Salamander Cooking Stove.

A, Circular hearth.
B, Furnace cylinder.
C, Upper cylinder, or drum.
D, Top plate, with openings.
E, Pipe.
The dotted lines show the place of the partition, with dampers, forming the curved flue within the upper cylinder.



Specification of improvements made for equalizing the heat in, and correcting the smell from, Cook Stoves, and for improving the quality and flavor of articles cooked therein, especially where anthracite coal is the fuel in use. Granted to ELIPHALET NOTT, *Schenectady, New York, January 7th,* 1835.

Whereas, in cook stoves, having ovens constructed of iron plates, through which the heat is transmitted from the flame in passing along and around the same, the heat is variable, the smell offensive, and the quality and flavour of the articles cooked, injured: therefore, an improvement has been introduced, which consists—

In substituting ovens, the crust of which, so far as the same is exposed to the action of the interior furnace, or flue, but especially the furnace, is constructed, in whole or in part, of brick, stone, or other material, that is a poor conductor; and so far as the same is exposed to the action of the exterior air, is constructed of tin, polished brass, or other material, that is a good reflector; and also in opening an aperture for the escape of steam to the flue in ovens heated laterally.

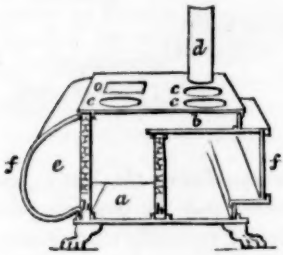
The form and relative positions of which furnace, flue, and ovens, may be varied at pleasure, provided only the whole be so combined, that the heat from the furnace and flue be transmitted to the oven, through brick, or stone, &c., on the inside, and reflected from tin, polished brass, &c., on the outside. For further information, reference may be had to the explanations and drawings connected herewith.

SUMMARY.—The invention and improvement herein contemplated, consist in equalizing the heat, correcting the smell, and improving the quality and flavor of articles cooked in stoves, by so constructing and combining the furnace, flue, and ovens, that the heat shall be transmitted from the former to the latter through brick, or stone, &c. on the inner side, and reflected from tin, polished brass, or other reflector, on the outer side, in place of being, as heretofore, transmitted through, and reflected from, iron.

I, therefore, claim as my invention and improvement, the construc-

tion and combination of the furnace, flue, and oven, whether fixed or movable, in a cook stove, especially where anthracite coal is the fuel in use, in the manner, and for the purposes, above set forth, together with the uses to which the same has been, or may hereafter be, applied.

ELIPHALET NOTT.



a, chamber of combustion.
b, flue for flame.
c c c, kettles in places.
d, smoke pipe.
e e, ovens.
f f, exterior tin crust of ovens.
g g, exterior brick crust.
h h, interior iron crust.
o, inlet for fuel.

Specification of a Patent for a Mode of Heating Reverberatory or Puddling Furnaces, with Anthracite Coal. Granted to M. BROOKE BUCKLEY, *of Pottsville, Schuylkill county, Pennsylvania, January 16th,* 1835.

The common and only mode now in use of heating reverberatory or puddling furnaces, is by the flame of bituminous coal created by the draught of high stacks, or chimneys. The coal is placed upon a grate, and the air passing freely under it is sufficient for the use of bituminous coal; in my discovery, or invention, I use the anthracite coal placed in a cylinder, or chamber, the size of which must be in proportion to the size of the furnace; for common uses, two feet in diameter by three feet high is sufficient, but it may be made of any convenient size or shape to suit the furnace. I substitute a blast created by a common blowing apparatus, and applied to the coal contained in the cylinder, or chamber, which is made of fire clay, or brick, or of any suitable fire-proof material. The blast is introduced by a pipe at or near the bottom of the chamber, and thereby expels a powerful flame, which passes into the furnace, and creates the necessary heat for all the variety of ores for which the reverberatory furnace is now, or may be, used.

The impurities of the coal are passed off in a fluid state through a cinder hole near the bottom of the coal chamber, and the fire is kept free and open by the blast.

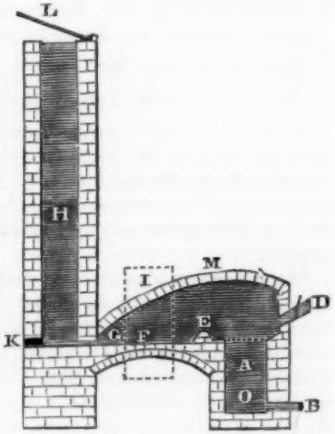
The use of the anthracite coal is much more economical, and more certain in its operation, than the bituminous, and will produce an immense saving in the process of refining and manufacturing iron, which will go far towards placing the United States upon an equality with Europe in that species of manufacture.

What I claim as my invention and improvement, is the introduction or application of anthracite coal to the reverberatory or puddling furnace, by means of blast, to expel the flame and heat therefrom, instead of the draught created by the high stack, or chimney, now in use for the bituminous coal.

The accompanying drawing represents the furnace, with my invention and improvement, as constructed of common brick, lined with fire brick, arched, and bound together with cast-iron plates and bars.

M. BROOKE BUCKLEY.

A, the circular chamber containing the coal.
B, the blast hole.
O, the cinder hole in the chamber.
D, the stack hole for introducing coal.
E, the bridge of the furnace.
F, the bottom where the material to be acted upon is placed.
G, the throat.
H, the stack.
I, the door represented by dotted lines.
K, the cinder hole of the furnace.
L, the damper, to be suspended by a lever.
M, the roof, or arch.



Specification of a Patent for an improved Mill, for Grinding Corn, Malt, &c., called the "Farmers' Mill." Granted to JOHN R. SLEEPER, *city of Philadelphia, January 27th,* 1835.

A frame sufficiently strong, and of any suitable materials, is made, between, or upon, the timbers of which three or more rollers of iron, or any other suitable material, are confined, and made to revolve in such a way that the grain, &c. may pass between each set of rollers. The plan best adapted to that purpose, will be to make one roller as much larger as will admit two or more small rollers to revolve in opposite directions, and with different velocities on one side of it, (something in the manner of a carding machine,) in such a way that the grain, &c. passing between or under the first roller, may, by its gravity, pass under the next roller in succession, and so on as many as may be found necessary to accomplish the desired purpose, which for Indian-corn, barley, &c., three rollers have been found sufficient. For flour, probably four, or more, will be found necessary. Adjusting

screws, wedges, &c., will be found necessary, in order to set the rollers to grind fine and coarse.

What I claim as my invention, discovery, or improvement, and not previously known in the above described mill, or machine, is, applying more than two rollers, and running them at different velocities, thus adapting them to the principle of grinding grain, coffee, &c., which otherwise cannot be accomplished.

JOHN R. SLEEPER.

ENGLISH PATENTS.

¶ *Specification of the Patent granted to* JOHN HENRY CASSELL, *for a Cement, or Combination of Materials, applicable to the different purposes for which Cement, Stone, Brick, or other similar substances, may or can be used. Sealed April* 19, 1834.

To all to whom these presents shall come, &c.:—Now know ye, that in compliance with the said proviso, I, the said John Henry Cassell, do hereby declare that the nature of my invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following description thereof, (that is to say:)

My invention consists in cementing and combining the materials for road making, and for constructing docks, water-courses, foundations, and such like works, by the aid of coal, or other mineral tar, wood tar, and resinous matters, or the products of tar, in the manner hereafter described, and thus producing a concrete mass, which may be formed or moulded into the desired figure, which, when cold, will be exceedingly hard, and be suitable for the purposes of cement, stone, or brick, in constructing such works as before mentioned. But, in order that my invention may be fully understood, and carried into effect, I will describe the methods I pursue for combining such materials together, and applying them to the purposes aforesaid. I take a quantity of tar, such as is produced by the distillation of coal, shale, or wood, and by further distillation, I separate the aqueous part therefrom, and thus reduce the tar or resinous substance to the consistency of treacle, and this I call the first product, the tar, or resinous substance, being in a thick and adhesive condition when cold. In order to produce the second product, I carry on the distillation still further, and by this means I obtain the essential oil; and for the third product, I carry on the process of distillation till the substance becomes so adhesive, that, a small portion being removed from the still, will draw out into threads, and, when cold, becomes brittle; this will soon be judged of by practice; and for the fourth product, I carry on the distillation still further, till the substance becomes extremely hard, and which will not soften by the heat of the sun. The apparatus, or still, which I use for this purpose, is similar to what is called a pitch still, which is well known, and forms no part of my invention, nor does the process of distilla-

tion for separating the tar into three products, that is to say: First, tar deprived of the aqueous parts, and reduced to a thick and adhesive condition when cold. Secondly, the essential oil. Thirdly, the adhesive tar, (or product thereof,) which, when cold, is hard: and, fourthly, the substance not acted on by the heat of the sun. It will be desirable here to remark, that I prefer coal tar, in consequence of the low cost at which it can be obtained.

I will now proceed to describe the combining of these products with other materials, in forming a cement, or combination, in the making of roads, docks, water-courses, and such like works. I will first describe the method I pursue in applying my invention to the making of roads, and in repairing them. Having laid out the road, and made the necessary drains for preventing the lodgment of water below the road, I prepare the surface by beating, or rolling, in order to compress the earth, particularly when such surface is composed of loose earth, and, by raking, bring the surface to the figure desired, that is, with such slopes as I have determined on, and make the same as even as possible. I then saturate such surface with the essential oil,(the second product) in thin layers, allowing time to subside. The oil thus laid on will quickly penetrate the earth. I then proceed with the second operation, which consists of laying over the surface of the earth so prepared, a thin coating of the first product, say one-fourth of an inch thick, and set fire to the same, and permit it to burn a few seconds. Dry sand, or fine dry earth, or slag, or cinder, or a combination of these, are to be sifted on the tar and oil, to the depth of about half an inch, which will put out the flame. I then beat or roll the same, in order to blend or cement them together, and, in order to facilitate the operation, I find it desirable to have a frame of iron, or other material, about three feet square, which I successively place over the surface of the road, and thus complete portions of the surface at each operation. By this means, it will be evident that I produce a thin cemented layer, or surface, on the road. In some instances I make one, two, or more, layers of this description on the road, depending on the extent of traffic to which it is to be subjected; but it will be desirable to remark, that I only use the essential oil previous to the first layer. Having thus prepared the under surface of the road, I proceed to finish the same, and the finishing materially depends on the description of materials which may readily be obtained where the road is making, broken granite, or flint, or slag, or gravel, or hard material suitable for the surface of a road; and I mean, in the present instance, that the same should be broken somewhat small, say not larger than three inches, and I take, by weight, one of the third product to two of sand, and boil and mix them well together; I lay over such broken materials to the desired depth, and then pour in such sand and third product, which, running into the space between the stones, forms a solid mass when cold. When the said fourth product is in a melted state, I mix, in an open vessel, any of the materials, sand, stone, &c., in the proportion of one of the fourth product to three of the stone, sand, &c., by weight, and combine them well together, and when so combined, I lay them over the surface of

the road, from one to four inches, or more, if desired, the road being prepared as before described; this is to be beaten down, and as even a surface as possible produced, by which means a hard surface will be formed, and will wear exceedingly well, and produce a cheap and lasting road. Or, where it is desired that the upper surface should be formed of larger stones, or other material, such as broken granite, flints, slag, or other substances, of a size such as is used in making what are called Macadamized roads, or larger, I have frames, or moulds, from twelve to forty-eight inches square, open at top and bottom like a brick mould, and pack in a number of such broken pieces of material, and then run in a quantity of the fourth product in a melted state, and thus fill up the interstices between the stones or other materials; and, making the upper surfaces as even as possible, these materials are left in the moulds till they are cold; they will then be strongly cemented together, and be ready to form the upper surface, or road, and they are to be put on in the following manner: having prepared the road, as above described, by the essential oil, and the first product, and the sand, or fine earth, or other material, I lay over a coat, say one inch, of the third product of the tar, then cover the surface, whilst the third product is hot, with the moulded materials, placing that part which was uppermost in the act of moulding, on the surface of the road prepared as above, and, by beating or pressing, cause the moulded parts to adhere firmly; by this means, a rather rough surface for the tread of a horse will be produced to the road. I also use the first preparation to cover good Macadamized, or other, roads, which firmly cements every stone into its place, prevents the wheels from ploughing the roads, the water from softening the sub-strata, and preventing mud and dust from rising. I also use the third preparation of tar, when in a melted state, to pour between the joints of street pavements, in the manner that grouting is now performed; this will cement every stone together, and prevent the water from getting to the sub-soil, or rising therefrom, which causes the present pavement to sink in different parts. If the street is required to be very durable, or the sub-strata is of a soft substance, I first prepare the ground as described in the first process; I then saturate the paving stones with essential oil, and run the third product between the joints of the stones, or bricks, that are required for foundations; I saturate with essential oil, and set them with the third product. The resin of wood I use for making stone and cast figures, that are required to be of a yellow colour; I add sand of the required colour, as in the fourth process. In some instances, in place of moulding such larger pieces of stone, or other material, I mix sand, or fine earth, or other material, with the fourth product, when in a hot and melted state, and mould the same as above described, such materials being very suitable for foot-paths, water cisterns, pipes, and a variety of other useful purposes.

Having thus described the nature of my invention, as applied to roads, I will proceed to describe its application to canals, docks, water courses, and such like works. Having excavated the earth, and made the slopes of the banks to the intended figure, I proceed to

beat the surface of the earth; in order to render the same as compact as possible, I saturate it with the essential oil, as before described; then lay over a thin coat of the first product of the tar, and set fire to the same; then sift over sand, or other dry earth, or material, as above described. Three layers of these cemented materials, when applied to the usual slopes for canals and water courses, will be sufficient, and will offer a compact and close surface to the water, which will protect the banks from the prejudicial washing thereof, and, consequently, be of great utility when quick transit is desired, or when the canal boats are propelled by machinery. In forming the embankments of docks or quays requiring steep or perpendicular walls, a much stronger facing is required, depending on the depth of the water they are to sustain, and also the description of ground behind; and I usually construct a framing of wood to the desired thickness, and having previously made a good base or foundation of a combination of the fourth product of the tar and broken stones, or other rough, hard materials, and sand, or earth, I continue melting and mixing quantities of the said fourth product of tar, and broken stones, and sand, in the proportions of about one of the fourth product to three of the stones and sand, or other material, and successively throw them into the frame, and level and beat such concrete mixture till the frame is full to the surface of the intended finish of the wall, which I usually make to lay on the surface of the earth. I would here remark, that between each quantity of the material thus put into the frame, I find it desirable to lay over a thin coat of the first product of the tar, and light the same, in order that the surface of the last quantity should be in a melted state, to receive the next quantity of the materials. It will be evident from the above description, that piles, and also land ties, may be built in the walls, in order to give additional strength to them; and I would remark that, where frames, or moulds, are used, I wash the same over with a covering of whitewash, or of clay, by which means the moulds, or frames, separate readily from the substances.

Having thus described the nature of my invention, and the manner of carrying the same into effect, I would have it understood that I lay no claim to any of the materials separately; and it will be evident that the means of carrying the same into effect, may be varied to suit the particular object to which the invention is to be applied; but I would have it understood that what I claim as my invention, is, the cementing or combining the materials for making and mending roads, and for constructing docks, water courses, water tanks, pipes, and such like works, by the aid of tar and resinous substances, or the products thereof, as above described.

Specification of the Patent granted to JOHN B. C. TORASSA, PAUL I. MUSTON, *and* HENRY W. WOOD, *for certain improvements in Making or Producing the Pigment commonly known by the name of White Lead, or Carbonate of Lead. Sealed December* 11, 1833.

To all to whom these presents shall come, &c. &c.: Now know ye, that in compliance with the said proviso, we, the said John B. C. Torassa, Paul I. Muston, and Henry W. Wood, do hereby declare the nature of the said invention to consist in making or producing the pigment commonly known by the name of white lead, without the use or employment of vinegar, or acetic, or acetous, acid, in any other form, or under any other name, and without the aid of artificial heat, except for the purpose of drying the white lead, as hereinafter mentioned, by reducing the ordinary lead of commerce, by friction in water, to a very fine powder, and then exposing the said powder to atmospheric air, so that it may acquire both oxygen and carbonic acid, and thus be converted into the pigment aforesaid. And in further compliance with the said proviso, we, the said John B. C. Torassa, Paul I. Muston, and Henry W. Wood, do hereby describe the manner in which the said invention is to be performed, by the following statement thereof, reference being had to the drawings annexed, and to the figures and letters marked thereon, (that is to say:)

We cut common sheet lead into very small pieces, or grains, or, what is preferable, we form lead into what may be termed shot, in the same manner as patent shot is made, except that no other ingredient is used to cause the lead to cool in a perfectly round form. The exact shape of the pieces of lead is immaterial, but the shape of shot is the most convenient. These shots, or pieces of lead, should be about the size of *duck shot*, and having procured any given quantity, we place them in an open, shallow, wooden vessel, lined with sheet lead, which we call a friction vessel, covering the bottom of the vessel with the shot, or pieces of lead, to the depth of about one inch, and then add water sufficient to cover them, but not more. We then tip the vessel containing the shot, or pieces of lead, from side to side, in such manner as to cause the shots, or pieces of lead, to roll backwards and forwards on the bottom of the vessel, and thus produce great friction of the pieces of lead one against the other, and this friction will produce an extremely fine powder of lead mixed with the water, from which it will separate easily, if left to subside. We then remove the moist powder, which is, at an early period of the process, of a dark colour; pass it through a fine sieve, and expose it for about eight or ten days to atmospheric air, whilst the powder is still in a moist state, and about the consistence of thick cream, in another shallow, open vessel, which we call the carbonating vessel, where we agitate or stir it constantly, in order to expose it as much as possible to the action of the atmospheric air, until it assumes a beautiful white colour, and is thus converted into the pigment com-

monly known by the name of white lead, or carbonate of lead. The carbonating vessel may be made of any convenient material, but we prefer wood as nearly colourless as possible. When the white lead is thus produced, if it should still contain any moisture, it should be well dried before it is put into casks for sale.

Description of the Drawings.

Fig. 1 is a perspective elevation of a friction vessel, such as we prefer for the purposes of the said invention; it consists of a shallow box, or tray, lined with sheet lead, turning on a shaft, or axis, passing under it, which rests at each end in a slot formed in an upright standard, as shown at A A; to these standards are fixed cross pieces, B B, which serve as stops to prevent the tray from ever tipping, or dipping beyond an angle of forty-five degrees. C C are two handles, by which the front of the tray is moved up and down by the operator, the tray turning on its axis, as here shown. D D are two flaps, or wash boards, to keep the shot, or pieces of lead, and the water, from spilling over when the tray is in action.

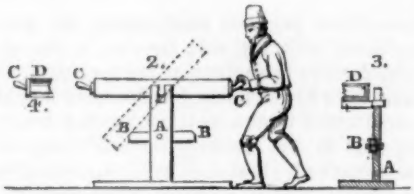
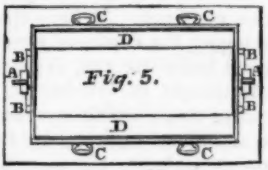


Fig. 2 is a side elevation of the same vessel, showing how the operator stands to work it. The dotted lines show the greatest angle at which the tray can be placed; and as similar letters are used to denote similar parts in all the figures of the drawing, no further description of this figure will be necessary.

Figs. 3 and 4 are sections of parts of fig. 2, fig. 3 being taken longitudinally, and fig. 4 transversely.

Fig. 5 is a plan of the friction vessel. Of the carbonating vessel, it is only necessary to say that a tub, or any other open and rather shallow, wooden vessel, will answer the purpose.



Now whereas, we do not claim as the said invention, the form of the friction or carbonating vessels here given, or the particular manner hereinbefore described of agitating the lead, though the foregoing is the process we usually employ, as being the best adapted of any we now know of

for the purpose, when engine power is not used; but we claim as the said invention, the following improvements, (that is to say,) making white lead without the use of vinegar, or acetic, or acetous, acid, in any other form, or under any other name, and without the aid of artificial heat, except for the purposes of drying the white lead, as hereinbefore mentioned, and converting the ordinary lead of commerce into the pigment commonly known by the name of white lead, or carbonate of lead, by reducing it to a fine powder by friction, as aforesaid, and then converting that powder into the said pigment, by exposing it to the action of the atmosphere, as hereinbefore described. And such invention being, to the best of our knowledge and belief, entirely new, and never before used, we do hereby declare this to be our specification of the same, and that we do verily believe this our said specification doth comply, in all respects, fully, and without reserve or disguise, with the proviso in the said hereinbefore in part recited letters patent contained; wherefore we do hereby claim to maintain exclusive right and privilege to the said invention.

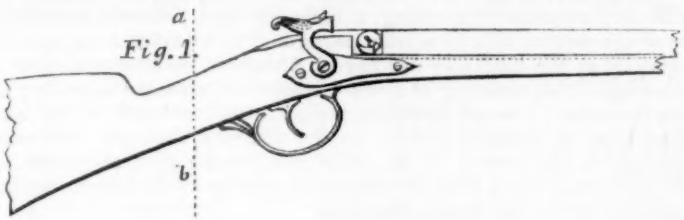
[*Rep. Pat. Inv.*

Specification of the Patent granted to WILLIAM S. GILLETT, *for certain improvements in Guns, and other Small Arms. Sealed February* 8, 1834.

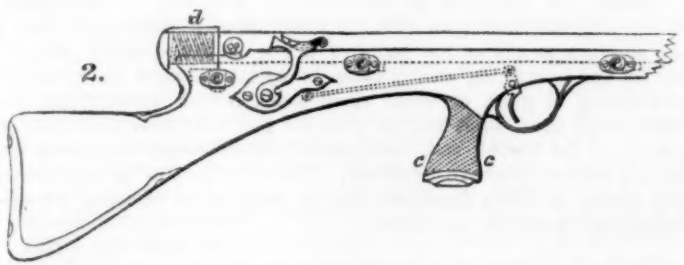
To all to whom these presents shall come, &c. &c.: Now know ye, that in compliance with the said proviso, I, the said William S. Gillett, do hereby declare the nature of my invention, and the manner in which the same is to be performed and carried into effect, are fully described and ascertained in and by the following description thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked, (that is to say,) according to the ordinary construction of fowling pieces, muskets, rifles, pistols, and such like small arms; the hand which holds, and also fires, the gun or pistol, is placed (with the exception of the finger which pulls the trigger) at, or behind, the breech of the gun or pistol. It consequently follows, when the barrel is long and heavy, it becomes desirable to increase the weight of the stock, in order to make the centre of gravity of the gun or pistol come as near as possible to the place where the hand (which fires) holds the gun or pistol, in order to facilitate, as much as possible, the raising the gun, to bring it to point in the direction required. Where the stock is not weighted for the purpose of bringing the centre of gravity of the gun to the point where the firing hand holds the gun, (that is, at or about the breech of the barrel,) the weight of the barrel, particularly in heavy guns or pistols, requires considerable exertion in supporting them in the act of pointing, when about to fire. By the words, the "*hand which fires*," I mean, under ordinary circumstances, the right hand, in contradistinction to the hand which only acts as a rest, and usually the left hand. And it will be desirable here to remark, that, by weighting the stock, as before mentioned, although it assists and facilitates the act of pointing, it nevertheless materially adds to the fatigue of carriage.

Now, the object of my invention is to construct or mount the barrels of rifles, muskets, fowling pieces, and other such like guns and small arms, in such manner that the hand which holds and also fires the gun, or other small arms, is placed considerably forward of the breech, and approaches as nearly as possible to the centre of gravity of the barrel; the stock, or butt, of the gun projecting only a short distance from the end of the barrel, and, consequently, not materially operating to vary the centre of gravity of the whole gun, from the centre of gravity of the barrel, whereby I am enabled to produce guns, and other small arms, having a given length and strength of barrels much lighter, and more capable of being handled, than when mounted in the ordinary manner, and at the same time a gun, or other small arm, when mounted or stocked according to my invention, will, for a given length of barrel, be much shorter than when mounted or stocked as heretofore, and by this means a gun of greater power, though but of equal weight with an ordinary fowling piece, musket, or rifle, may be fired with much greater facility, at the same time it may be held with more firmness and steadiness, whilst any oscillation caused by a slight involuntary movement of the hands, arm, or body, (owing to the holding being considerably along the barrel,) will not so materially affect the pointing, as when the hand which holds and fires is placed at a greater distance from the muzzle of the gun, that is, at or behind the breech, as heretofore practised.

Fig. 1.



2.



Secondly, my invention consists in applying a spring, as hereafter described for the purpose of permitting a longitudinal movement to the barrel.

In order that my invention may be most fully understood, I will now describe the drawing hereunto annexed.

Description of the Drawing.

Fig. 1 represents the outline of an ordinary gun, or fowling piece, which I have drawn in order the more clearly to point out the object of my invention. The line, *a b*, is the point at which the hand which fires grasps the stock, whilst the other hand is carried forward as a rest for the barrel.

Fig. 2 represents a gun mounted, or stocked, according to my invention. In this figure, it will be seen that there is a projecting handle, *c*, considerably forward of the breech, and intended to be, as nearly as possible, at the centre of gravity of the barrel. This handle, *c*, is grasped by the hand which fires the gun, the trigger being in front of the handle, *c*, there being a connecting rod attached to the trigger, which connects it with the lock, as is shown by dotted lines; the lock being of any ordinary construction, but in this instance its action is reversed, the cock striking in an opposite direction to that which is usual, and this is with a view to allow of the barrel having a movement lengthwise, there being a coiled spring contained in the socket, *d*, into which the breech of the barrel enters and slides when there is a strong recoil, the slits through which the pins, *e*, pass, allowing of such a movement, as is shown by dotted lines in fig. 2; but I only recommend such an application of a spring to guns firing ball, as muskets and rifles.

I have not thought it necessary to show a drawing of a musket or rifle, as the manner of stocking, or mounting, such fire-arms, according to my invention, will be readily performed by a workman engaged in this part of the business; nor have I thought it necessary to show a drawing of the mounting of a pistol, stocked or mounted according to my invention; I would therefore remark, that there will be no butt like those to ordinary pistols; on the contrary, the stock will only proceed to the breech of the pistol, the holding part, or handle, *c*, being formed at, or near, the centre of gravity of the barrel, in like manner to the guns above described.

Having now described the nature of my invention, and the manner of carrying the same into effect, I would have it understood, that I lay no claim to any of the parts of a gun or pistol, which are well known and in use; but what I claim as my invention, is the mounting or stocking of guns, or other small arms, in such manner that the hand which fires, holds and supports the gun at or near the centre of gravity of the barrel, and, consequently, considerably forward of the breech thereof, as above described. Secondly, I claim the application of a spring, as above described, for the purpose of allowing a longitudinal movement to the barrel.

[*Ibid.*

Translations from Foreign Journals.

On the Cementation of Iron by Means of Carburetted Hydrogen. By M. Dufrenoy, *Chief Engineer of Mines.*

[Translated for this Journal, by Edward Poole.*]

Mr. Macintosh, one of the best informed mechanics in England, and to whom the chemical works in the neighbourhood of Glasgow are indebted for many improvements, conceived the idea of making steel of cementation, by exposing iron to a current of carburetted hydrogen gas. The apparatus which, after various trials, he found most convenient, consisted of a tube of cast-iron, coated inside with stiff clay, the same that is used in the construction of the furnaces on the Clyde. In order to prevent the usual contraction of clay, it is mixed with about a third of the same clay, baked, and afterwards reduced to a sufficiently fine powder. The tubes used by Mr. Macintosh, vary in length from five to six feet, the internal breadth from ten to eleven inches. The lining of clay is two inches thick; it should be well beaten, and have no fissures. To effect this, a cylinder of wood, rather less in diameter than the bore of the apparatus, is introduced, and the clay is then placed by small successive layers, as is practised in making pots for glass factories.

The tube has pipes at each end, one serving for the introduction of the carburetted hydrogen, while the gas escapes by the other; both these pipes are exactly closed, so that the carburetted hydrogen may remain in the tube as long as it is judged proper.

This tube is placed in a furnace, disposed in such a manner that it may be surrounded on all sides by charcoal.

Each tube is filled with from a hundred to a hundred and fifty pounds of iron; the bars are placed lengthways in the tube, taking care to keep them apart, and to separate every layer by small bars placed crossways, so that the hydrogen gas may be in contact with their whole surface. After the fire is lighted, and when the tube is sufficiently heated, a current of carburetted hydrogen gas, produced by the distillation of coal, is passed through. But, in order that the gas and the iron may acquire the proper temperature for cementation, the hydrogen is removed only every half hour. At the end of this time, the hydrogen gas is, in a great measure, deprived of the carbon it contained, and, on escaping from the tube, burns with a feeble light.

The time necessary for cementation depends upon the dimension of the iron bars to be cemented, and upon the temperature to which the apparatus is exposed. When the tube of cast-iron is of a reddish brown, and when the bars are two inches broad by six lines thick, only eighteen or twenty hours are requisite to complete the operation; the iron may be overcharged with carbon, with great facility. I have seen thin bars, which were almost in the state of graphite

* At the request of the Committee on Publications.

Proof bars, placed in the disks which close the tube, mark the state of cementation, and the moment when the operation should be stopped.

The steel, when taken from the tube, is covered with small blisters, or bubbles; it entirely resembles steel cemented by the ordinary process. Not having seen the apparatus in operation, I can give no detail as to the manner of conducting the process, neither do I possess any statement as to its economy. Mr. Macintosh, from whom I have received the few particulars that I have just given, is convinced that this process can, with regard to expense, sustain a competition with the ordinary method of cementation; he considers the steel obtained by the hydrogen gas as more homogeneous, and of a superior quality to that produced by the ordinary process. Mr. Macintosh has manufactured many tons of steel, to test the reality of his discovery, for which he has taken out a patent in England.

All the steel made by Mr. M. has been thrown into the market; the greatest part being converted into cast steel, has been used in the fabrication of fine cutlery, and for instruments which require steel of the first quality. [*Annales des Mines*, vol. v.

Report to the Directors of the London and Birmingham Railway Company, accompanied by Experiments on the Transverse Strength, &c. of Malleable Iron, with reference to its use for Railway Bars. By PETER BARLOW, *Prof. Royal Mil. Acad., Woolwich.*

(Continued from page 63.)

Preliminary Remarks.

It is only since the very general adoption of railways in this country, that malleable iron has been employed to any extent to resist a transverse strain, and writers who have undertaken experiments to investigate the strength of materials, have hitherto passed over those inquiries which relate to the transverse strength of this metal.* The extraordinary extent, however, to which malleable iron is now applied, to resist transversely a passing load, renders it highly essential that this resistance, and its other properties, should be fully investigated; for it is obvious that every additional weight of metal, beyond that which is requisite for perfect safety, is not only uselessly, but injuriously employed, it being generally admitted that bars beyond

* Some few experiments on the transverse strength of malleable iron have certainly been made. I have given three in my Essay on the Strength of Materials. Mr. Hodgkinson has also glanced at this subject, in his valuable paper of Experiments on Cast-iron,† published in the Memoirs of the Manchester Philosophical Society; and M. Duleau has treated of the subject in his "Essai Theorique et Experimental," &c., but those points of greatest importance connected with the application of this metal to the purposes of railways, have never formed the subject of inquiry.

† Jour. Frank. Inst., vol. ix., pp. 202, 261, 325, 379—vol. x., p 26.

a certain weight cannot be so well manufactured as those of less dimensions; and it is no less certain, that, by a proper disposition of the metal in the sectional area of the bar, (which depends on the data in question,) a greater strength may be obtained with a given weight of iron, than with a greater weight injudiciously disposed. Under these impressions, the following experiments have been undertaken, and to these inquiries only they have been directed; and I am not without hope that on those points they may be found useful.

Before, however, proceeding to these experimental researches, there is one subject, rather of investigation than of experiment, on which I have thought it necessary to bestow some attention, it being one on which the opinions of practical men are much divided; this is, the comparative advantages and disadvantages of what is called the fish-bellied rail, and that with parallel edges.

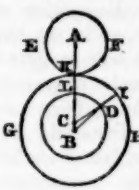
Examination of the Properties, Curvature, and Resistance, of the Fish-bellied Rail.

It is well known, both as a theoretical and mechanical fact, that if a beam be fixed with one end in a wall, or other immovable mass, to bear a weight suspended at the other end, the longitudinal section of such a bar (its breadth being uniform) should be a parabola, because, with that figure, every part of it will be strong in proportion to its strain, and thus one-third of the material may be saved. This form of construction is frequently adopted in the case of cast-iron beams in buildings, and with great advantage, as thereby one-third of the material is saved, while the strength is preserved, and the walls of the building relieved from a great unnecessary weight.

This seems to have led to a somewhat similar principle of construction in what is called the fish-bellied rail, and the question here is, with what advantage? In the first place, it is to be remarked that the figure, which theory requires in this case, is not, as in the preceding, a parabola; for, as in the transit of the locomotive, every part of the bar has, in succession, to bear the weight; and as the strain on any part of a beam supported at each end, and loaded in any part of its length, is as the rectangle of the two parts, the strength being as the square of the depth, it follows that the square of the depth ought to be everywhere proportional to the rectangle of the two parts, which is the known property of a semi-ellipse. The bar, therefore, in theory, ought to be a semi-ellipse, having its length equal to the transverse diameter, and the depth of the beam for its semi-conjugate, and there can be no doubt that such a figure would be, to all intents and purposes, as strong in its ultimate resistance as a rectangular beam.

But it is difficult to obtain this figure correctly in malleable iron, and many of what are called fish-bellied rails, are but bad approximations to it, although others differ from it but slightly. The following is the general mode of manufacture.

E F is the section of an iron roll; G H the section of another.



This latter being hung on a false centre, C, is turned down, leaving a groove of varying depth, as shown in the figure. The cylinder G H being now again placed on its proper centre, B, the bars, are introduced between the two rolls at K L; and as the iron passes through, it acquires the variable depth shown in the lower roll. The inner circle, or bottom of the groove, is generally one foot in diameter, and the upper three feet in circumference; consequently, the figure is completed in a length of three feet, and there are commonly five such lengths in a bar. The computation of the ordinates to the curve thus formed, is by no means difficult; for, calling the radius of the cylinder C D $= r$, and the distance of the centres B C $= d$ and x any angle L C D, we find the ordinate.

$$\text{I D} = \text{B I} - \sqrt{(r^2 + d^2 - 2\,r\,d\,\cos x.)}$$

And by this formula the ordinates of the curves have been computed for two different rails, the extreme depth in both being five inches, but the lesser depth in one three inches, and in the other three and three-quarter inches, the latter being that proposed by Mr. Stephenson for the London and Birmingham Railway. The ordinates are taken for each 10°, or for every inch of the half-length, and in the last column are given the ordinates of the true ellipse.

Table of Ordinates.

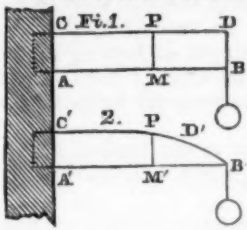
Abscisses.			Ordinates in Fish-bellied rail. Greatest depth 5 inches. Least do. 3 in.	Ordinates in Mr. Stephenson's rail.	Ordinates in the Ellipse.
Deg.		Inch.			
0	=	0	3.00	3.75	0
10	or	1	3.01	3.76	1.64
20	..	2	3.05	3.78	2.29
30	..	3	3.12	3.82	2.76
40	..	4	3.21	3.88	3.14
50	..	5	3.31	3.95	3.46
60	..	6	3.44	4.04	3.72
70	..	7	3.59	4.14	3.96
80	..	8	3.75	4.23	4.16
90	..	9	3.92	4.34	4.33
100	..	10	4.09	4.45	4.48
110	..	11	4.27	4.55	4.61
120	..	12	4.43	4.66	4.71
130	..	13	4.59	4.75	4.80
140	..	14	4.72	4.84	4.87
150	..	15	4.84	4.91	4.93
160	..	16	4.93	4.95	4.97
170	..	17	4.98	4.99	4.99
180	..	18	5.00	5.00	5.00

We see by this table, (although it is impossible, with any proportions or degrees of eccentricity, to work out a true ellipse by this

method,) that we may approximate towards it sufficiently near for practical purposes, as Mr. Stephenson has done; while, on the other hand, without due precaution, we may so far deviate from it as to render the bar dangerously weak in the middle of its half-length.

As far as relates to ultimate strength, there can be no doubt Mr. Stephenson's rail is equal to that of an elliptic rail, and, consequently, to that of a rectangular rail of the same depth; but there is still an important defect in all elliptical bars, viz: that although this form gives a uniform strength throughout, it is by no means so stiff as a rectangular bar of a uniform depth, equal to that of the middle of the curved bar, and it is the stiffness rather than the strength that is of importance; for the dimensions of the rail must so far exceed those which are barely *strong enough*, as to put the consideration of ultimate strength quite out of the question. The object, therefore, with a given quantity of metal, is to obtain the form least affected by deflection; and, unfortunately, the elliptical bar, although equally as strong as the rectangular bar of the same depth, as far as regards its ultimate resistance, is much less stiff. This will appear from the following investigation.

The deflection which beams sustain when supported at the ends, and loaded in the middle, is the same, as the ends would be deflected, if the beams were sustained in the middle, and equally loaded at the ends, each with half the weight; and the *law* of deflection is the same in the latter case, as when the beam is fixed in a wall, and loaded at its end, although the *amount* is greater. At present, however, our inquiry is not the actual, but the relative deflection in two beams, one elliptical, and the other rectangular, of the same length, and of the same extreme depth, the breadth and load being also equal in each. It is quite sufficient, therefore, to consider the corresponding effects on two half beams, each fixed in an immovable mass, as represented in the preceding figures.



Now, in the first place, the elementary deflection at C is the same in both beams, because the lengths and loads are the same, and the depths at C A equal; but the whole deflection at any other point, P, will be directly as M B^2, and inversely as M P^3. If, therefore, we call M B = x, and M P = y, the sum of all the deflections in the two beams will be $\int \frac{x^2}{y^3} . d x \triangle$, $\triangle$ being the sine of deflection at C. But in fig. 1, y is constant and equal to d, (the depth,) while in the latter,

$$y = \frac{d}{l} \surd (2 l x - x^2)$$

l being the semi-transverse, or length, and x any variable distance.

The whole deflections, therefore, in the two cases, are,

Fig. 1. Deflection $= \int \frac{x^2\, d\, x}{d^3}\, \Delta = (\text{when } x = l)\ \frac{1}{3}\, \frac{l^3}{d^3}\, \Delta$

And in Fig. 2:—

$$\text{Deflection} = \int \frac{x^2\, d\, x\, \Delta}{\frac{d^3}{b}\, (2\, l\, x - x^2)^{\frac{3}{2}}} = (\text{when } x = l)\ .41\, \frac{b}{d^2}\, \Delta$$

The deflections, therefore, in the two cases, are, with the same weights, as 33 to 41,* or nearly as 3 to 4, a result fully borne out by subsequent experiment. It is to be observed, also, that this investigation applies only to the deflection when the weight is in the middle of the bar, and that it would be much greater in comparison with the parallel rail towards the middle of its half-length.

This want of stiffness is, I should imagine, but badly compensated by the trifling saving of metal thus effected; for I find that an addition of little more than four pounds per yard would convert this rail into a rectangular one of the same depth, which would have one-third more stiffness at its middle point, and probably one-half more, a little beyond the middle of the half-lengths. I am aware, objections are made to rectangular bars having so much depth of bearing in their chairs, and this may be a practical defect, on which I shall offer no opinion; at all events, it is well to estimate properly both evils, and then to choose the least.†

Having thus satisfied myself on the nature of the fish-bellied rail, I proceeded with my experimental inquiries, which I have divided into the following sections.

1. To determine the extension of an iron bar of given area, under different degrees of tension; and hence the force with which the same bar will contract with a given reduction of temperature.

2. The comparative resistance of malleable iron to extension and compression, and thereby the position of the neutral axis.

3. The figure of the area of section, which gives the greatest strength with the same quantity of metal.

4. The strains which bars of given sections are capable of sustaining, without injury to their elastic power.

Experiments to determine the quantity which iron extends, under different degrees of tension.

With a view to this inquiry, an instrument was made as in the an-

* Experiments have been made, from which it has appeared that the fish-bellied rail was stiffer than the parallel rail, which is certainly possible, if the parallel rail be of inferior metal, or of injudicious figure, but it is mechanically impossible, if the parallel bar be made of the figure here assumed.

† It will be seen in a subsequent page, that, by introducing what is called a lower web, that, weight for weight, a parallel rail may be made as strong as the fishbellied, with only an additional depth in the chair of three-quarters of an inch.

nexed sketch. *a b c d* is a piece of brass, about one-fifth of an inch thick, having an arc at top, divided into tenths of inches; *h f g* is a hand, with a vernier, turning freely on a centre, *h;* and *i* is a steel pin, about half an inch long, projecting perpendicularly forward; the distances *f h* to *h i* being as 10 to 1: *e* is a small end, with a screw, for the purpose described below;

Fig. 1.

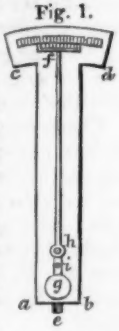
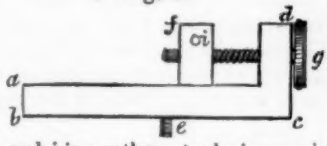
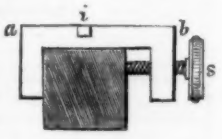


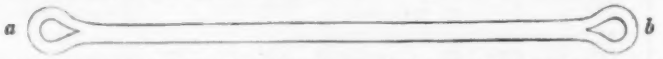
Fig. 2.



a b c d is another piece of brass, having a screw, *e;* *f* is a piece working in a dove-tail, adjustable for position by the screw *g;* and *i* is another steel pin, projecting forward. *a b* is an iron saddle piece, with a set screw, *s;* and at *i*, a hole is tapped to receive the screw *e*, fig. 2, and another saddle piece, exactly like this, is made to receive the screw *e*, of fig. 1.



The iron bars intended to be experimented upon, were made of the annexed form, about ten feet in length; these, by proper bolts and sheckles, were fixed at *a* and *b* in the proving machine;* the



two saddle pieces were then fixed on at the exact distance of 100 inches; the instruments, fig. 1 and 2, screwed into their respective saddle pieces; and a light deal rod hung, by means of two small holes formed in it, (also at the distance of 100 inches,) upon the two pins, *i i;* and then, by means of the set screw, fig. 2, the vernier of fig. 1 was adjusted exactly to zero. The pump of the hydraulic press was now put in action, and after one, two, or more, tons pressure were on, according to the size of the bar, and every thing brought well to its bearing, the hand was again adjusted to zero, after which the index was read for every additional ton. Here it will be seen, that, whatever the bar stretched between the two instruments, the lower pin of fig. 1 was drawn forward, and the index end thrown back ten times that amount, consequently, to ten times the actual amount of the quantity stretched.

It has been observed that after one, two, or more, tons strain were applied to bring every thing well to its bearing, the index was adjusted to zero, and its reading afterwards carefully registered as each additional ton was added. The strain during the experiment was re-

* The Lords Commissioners of the Admiralty having been pleased to allow me any facilities his majesty's dock-yard at Woolwich afforded, for conducting these experiments on a proper scale, the proving machine here referred to is a hydrostatic press, constructed by Messrs. Bramah's, principally for the purpose of testing or proving the iron cables, before they are issued for service. It is an excellent machine of its kind, is capable of bearing a strain of one hundred tons, and is very sensible to a difference of strain of one-eighth of a ton.

peatedly let off, and the index was found to return to zero, till the strain amounted to about nine or ten tons per inch, when the stretching became greater for each ton, and the bar did not any longer regain its original length when the strain was removed, its elasticity with this tension being obviously injured.

These experiments required more attendance than it was possible for one person to give; the adjustment of the weights, the reading and registering the index, required each the undivided attention of one individual; the pumping also required to be watched with care. And I have great pleasure in acknowledging the ready assistance I received from Messrs. Lloyd and Kingston, the Engineers of the yard; from Mr. P. W. Barlow, Civil Engineer; as also from Lieutenant Lecount, who came from Birmingham to witness and assist in the experiment.

Experiments on the Longitudinal Extension of Malleable Iron Bars, under different degrees of direct tension.

TABLE I.

Bar No. 1, 1 inch square. February 21st.			Bar No. 2, 1 inch square. February 21st.		
Weight in tons.	Index Readings.	Parts of the whole bar extended by each ton.	Weight in tons.	Index Readings.	Parts of the whole bar extended by each ton.
2	zero		2	zero	
3	.0625	.0000625	3½	.11	.0000733
4	.156	.0000935	4	.15	.0000800
5	.265	.0001090	5	.24	.0000900
6	.375	.0001100	6	.35	.0001100
7	not observ'd	mean	7	.44	.0000900
8	.562	.0000935	8	.52	.0000800
9	not observ'd	mean	9	.62	.0001000
10	.750	.0000940	10	.70	.0000800
11	.875	.0001250	11	.81	.0001100
			12	1.13	Elasticity injured

Bar No. 3, 1 inch diameter. February 23d.			Bar No. 4, 1 inch diameter. February 23d.		
Weight in tons.	Index Readings.	Parts of the whole bar extended by each ton.	Weight in tons.	Index Readings.	Parts of the whole bar extended by each ton.
1	zero		1	zero	
2	.16	.0001600	2	.15	.0001500
3	.31	.0001500	3	.28	.0001300
4	.44	.0001300	4	.42	.0001400
5	.56	.0001200	5	.56	.0001400
6	.67	.0001100	6	.69	.0001300
7	.79	.0001200	7	.79	.0001000
8	.91	.0001200	8	.97	.0000800
9	.103	.0001200	9	.116	Elasticity destroyed

Mean extension per ton, per square inch, bar No. 1, .0000982. No. 2, .0000903. No. 3, .0001010. No. 4, .0000976. Mean of the four, .0000967.

TABLE II.

Bar No. 5, 2 in. square. February 28th.			Bar No. 6, 2 in. square. February 28th.			Bar No. 7, 2 in. square. March 7th.		
Weight in tons.	Index Readings.	Parts of the whole bar extended by each 4 tons.	Weight in tons.	Index Readings.	Parts of the whole bar extended by each 4 tons.	Weight in tons.	Index Readings.	Parts of the whole bar extended by each 4 tons.
4	zero		4	zero		4	zero	
6	.100		6	.090		6	.065	
8	.180	.000180	8	.150	.000150	8	.125	.000125
10	.240	.000140	10	.210	.000120	10	.175	.000110
12	.290	.000110	12	.250	.000100	12	.230	.000050
14	.350	.000110	14	.290	.000080	14	.280	.000050
16	.400	.000110	16	.335	.000085	16	.335	.000050
18	.450	.000110	18	.375	.000080	18	.385	.000105
20	.500	.000100	20	.410	.000075	20	.435	.000100
22	.550	.000100	22	.445	.000070	22	.480	.000095
24	.600	.000100	24	.485	.000075	24	.530	.000095
26	.650	.000100	26	.525	.000080	26	.575	.000095
28	.695	.000095	28	.565	.000080	28	.625	.000095
30	.740	.000090	30	.620	.000095	30	.670	.000095
32	.790	.000095	32	.660	.000095	32	.715	.000090
34	.825	.000085	34	.730	.000110	34	.755	.000085
36	.860	.000075	36		Full	36	.805	.000090
38	.920	.000095	38		elasticity	38	.850	.000095
40	1.05	.000145	40			40	.900	.000095
		Elasticity exceeded						Elasticity perfect

Mean extension per ton, per square inch, No. 5, .0001082. No. 6, .0000297. No. 7, .0000841. Mean, .0000946. Mean of preceding table, .0000967.

Collecting the results of these seven experiments, and reducing them all to square inches, we find that the strain which was just sufficient to balance the elasticity of the iron, was in—

Bar, No. 1,	(re-manufactured iron)	10 tons.
2,	ditto	11 tons.
3,	New Bolt	11 tons.
4,	ditto	10 tons.
5,	(re-manufactured)	9.5 tons.
6,	ditto, from old furnace bars,	8.25 tons.
7,	New bar, by Messrs. Gordon,	10 tons.

We may consider, therefore, that the elastic power of good iron is equal to about ten tons per inch, and that this force varies from ten

to eight tons in indifferent and bad iron. It appears, also, (considering .000096 as representing in round numbers $\frac{1}{10000}$th) that a bar of iron is extended one-ten-thousandth part of its length by every ton of direct strain per square inch of its section; and, consequently, that its elasticity will be fully excited when stretched to the amount of one-thousandth part of its length.

Remarks on the foregoing Experiments.

These results have an important bearing on the question of railway bars. We shall see, in the following section, how they become applicable to the investigation of the transverse strain; but, at present, I shall only speak of them as they apply to the fixing of the rail to the chair. Amongst the numerous models which the directors did Messrs. Rastrick, Wood, and myself, the honour to submit to our inspection, for the purpose of awarding their prize, there were several in which it was intended to fix the rail permanently to the chair—a very desirable object, if it could have been safely adopted; and it was the want of data to enable us to decide on this point, which first led me to propose this course of experiments. The question is now satisfactorily answered. We have seen that, with about ten tons per inch, a bar of iron is stretched $\frac{1}{10000}$th part of its length, and its elasticity wholly excited or surpassed. Again, admitting 76° to be the extreme range of the thermometer in this country between summer and winter, it appears, from the very accurate experiments of Professor Daniell,* that a bar of malleable iron will contract with this change $\frac{1}{2000}$th part of its length. And hence it follows, that if the rails were permanently fixed to the chair in the summer, the contraction in the winter would bring a strain of five tons per inch upon the bar, and a strain of twenty-five tons upon the chair, (the bar being supposed of five-inch section,) thereby deducting from the iron more than, or full, half its strength, and submitting the chair to a strain very likely to destroy it. Every proposition, therefore, for permanently attaching the rail to the chair, is wholly inadmissible.

These remarks may also be carried still farther. If it be dangerous to attach the rail *directly* to the chair, it must be bad in practice to affix it *indirectly* by wedges, cotters, or otherwise, beyond what is absolutely essential to give it steadiness under the passing load, for it is evident that if, by these means, we could prevent any motion taking place, we should fall into the same evil as by the permanent attachment; and if, as most probably will happen, we fail of entirely accomplishing this, still all the friction which is produced, must be overcome by the contracting force of the iron, and be so much strength deducted from its natural resisting power.

The problem, therefore, which engineers have to solve, is, "To find a mode of fixing the rail to the chair, which shall give sufficient steadiness to the former, but which, at the same time, shall produce

* See Phil. Trans. 1831.

the least possible resistance to the natural expansion and contraction of the bar."

The quantity of motion which thus takes place, is certainly but small, viz: about one-eleventh of an inch between summer and winter, with a fifteen foot bar; but the force of contraction is great, amounting to five tons per sectional inch for the annual extremes, and frequently to not less than two and a half tons between the noon and night of our summer season, while the whole power of iron within the limits of its elasticity does not exceed nine or ten tons.

This is an important consideration, and, for want of attention to it, or, rather, in consequence of its amount not having been ascertained, a practice of wedging, or fixing, the rails has prevailed, which must necessarily have been the cause of great destruction to the bars.

I would also suggest here, as a matter deserving the attention of practical men, that, as the bar must necessarily contract, it will draw from that side which is least firmly fixed, and hence all the shortening will, most probably, be exhibited at one end, however slight the hold on either may be; and when it happens that the adjacent ends of two bars both yield, the space between the two is rendered double that which is necessary. To avoid this evil, one of the two middle chairs in each bar might be permanently attached to the rail, in which case the contraction must necessarily be made from each end, and the space occasioned by the shortening of the bars would then be uniform throughout, and much unnecessary and injurious concussion thus saved both to the rail, and to the carriage.

[TO BE CONTINUED.]

¶ *On the Domestic Offices of a House. By* I. J. KENT, *Esq., Architect.*

The Kitchen, a most useful and necessary apartment in every house, being chiefly used for the preparation of food, should be furnished with every thing necessary to enable a cook to perform her duties. It should be as lofty as circumstances will allow: this is a most important point, and should be attended to in all houses. In small houses it is especially necessary, as low kitchens are generally dark, and light is essential both to cleanliness and comfort. In many third and fourth rate houses in London, the kitchens are so low and dark, that the servants employed to wash up the tea things, glasses, and other articles, generally, in such houses, washed in the kitchen, cannot see when they are clean. When cooking is going on, the whole kitchen is filled with steam; the tin covers and other utensils, which ought to look bright, become dim, and every thing has an air of dirt and untidiness. In houses of these classes, therefore, the kitchen ought always to be made more lofty than it is at present; and, instead of the lowest, it ought to be the loftiest apartment in the house. In most parts of England, the kitchen is in the basement story, or on the ground floor; but in Genoa, and many other towns in Italy, it is in the upper story of the house. This is convenient for the escape of smells, but very inconvenient in almost every other respect. Sometimes the kitchen is on the same floor with the dining room, but

detached from the house, and under a flat roof, covered with lead, or, what is termed in London a lead flat. When this is the case, the flat should be pugged (stuffed between the roof and the ceiling with some non-conducting substance,) and ventilated, so as to keep out the intense heat, which would otherwise penetrate the lead. In houses of a superior description, the kitchen should be not only lofty and light, but also well ventilated, or supplied with air flues for carrying off the steam and the effluvia from the food. When this precaution is neglected, even in lofty kitchens, the steam hangs like a cloud below the ceiling, and the smell of the food, when cooking, is often found very unpleasant. Sometimes the escape of these effluvia to the living rooms of the house is prevented by pugging, but this only confines them to the kitchen, while the air flues carry them away into the open air.

Where practicable, the kitchen should look to the north, or the north-east, as should all those domestic offices which require to be kept cool. When the kitchen is under ground, as is frequently the case in England, particularly in large towns, this is not of so much consequence; but it should always be as near as possible to the dining room. In large houses, it is desirable to have a private communication between the kitchen and the dining room, by a passage (and staircase, if the kitchen, &c. are under ground) leading into an ante-room, or waiting room for the servants, adjoining the dining room. This passage should be thoroughly ventilated, so that any escape of effluvia from the kitchen, &c. may be dispersed before it reaches the ante-room. The ante-room should be furnished with broad shelves, fixed to the wall, with drawers beneath, to hold such articles as may be wanted by the servants waiting in the dining room. In some houses there is a hot table, warmed by pipes of hot water, or flues, to set the dishes on, when brought from the kitchen, before they are carried into the dining room.

A kitchen should be dry: the walls must therefore be preserved from damp, if the kitchen be underground, by building them in cement, at least as high as the level of the floor; and, where ground is against any of the walls, it may be necessary to build an inner wall one brick thick, and hollow, against the outer wall; or to build a dry area, carried down below the level of the floor of the kitchen, which area should be ventilated and drained. The floor should be of rubbed Yorkshire stone, laid on brick walls, at least two courses of bricks high above the ground. If the foundation is damp, concrete one foot or two feet thick, composed of clean gravel and fresh burnt stone lime, should be thrown in first, on which the walls should be built; and air should be introduced and made to circulate freely under the stone floor, for which purpose air gratings should be fixed in all the outward walls, and openings for the air to pass through left in all the walls on which the paving is laid.

In very large kitchens, a portion of the floor opposite the fireplace, about the centre of the kitchen, and from six to ten feet square, according to circumstances, should be of wood, that is, of oak joists and sleepers laid on brick walls, with a deal or oak floor. On this

wooden floor the table should be placed, and by this means the cook may generally be able to avoid standing on the stone floor. The skirtings should be made with cement, (not wood) wherever there are stone floors.

The ceiling of a kitchen should be always plastered; for, if this is not done, the effluvia arising from the cooking collect, and remain between the joists, in spite of all the ventilation you can provide; the spaces between the joists also afford shelter for flies, spiders, &c. As the ceilings of kitchens should be scraped, whitewashed, cleaned, and whitened (or coloured,) every year, the expense of plastering is soon repaid by the diminution of the surface; the sides of the joists making a surface of one and a half times more than the whole of the ceiling.

The doors should be all made to open towards the fireplace, otherwise the opening and shutting of them will be likely to cause the chimney to smoke.

The fireplace should be capacious in proportion to the quantity of cooking required; from four to eight or nine feet wide, and never less than two bricks and a half, or one foot ten and a half inches deep. Large fireplaces should be two feet three inches to two feet seven and a half inches deep; the range can then have a proper boiler at the back, supplied with water by a pipe from the main cistern, and regulated by a small feeding cistern, so that the boiler will always be full of water: where this plan is adopted, you will have a supply of hot, if not boiling water, at night as well as by day. A screen, extending the width of the opening of the fireplaces, is quite necessary, when much cooking is required, to render the kitchen complete and comfortable; this may be used as a hot closet, as well as a warmer for the plates and dishes, and it likewise saves fuel, by accelerating the roasting of the meat. In large kitchens there should be a hot plate and preserving stoves on one side of the fireplace, and a boiler on the other; these should be covered over, at the height of six or seven feet, by a projection or canopy from the wall, open in front, and communicating with a flue for carrying off the steam and effluvia from the meat. There should be one or two large closets, from three to four feet wide, and at least eighteen inches deep, for holding spices and other things that may be wanted by the cook.

The principal furniture required in a kitchen are, a table as large as the size of the apartment will allow, and made very strong; and a dresser, or dressers. The tops of these dressers should be two inches thick, and the drawers about two feet wide and seven inches deep. The space under the drawers is sometimes enclosed with doors, and sometimes open, having a pot board the whole width and length of the dresser, and raised three or four inches from the floor. There should be good locks on one or two of the drawers, and two iron or japanned handles fixed on each. A mill for coffee, one for pepper, and another for the finer spices, may be fixed to the ends of the dressers. Ranges of rails, furnished with hooks, should be fixed to the wall for the dish covers, and round towel rollers behind the doors. There should be an ash grate, and pit under the fireplace, and, in

large establishments, a smoke jack, as it is not only the best for roasting meat, but is always ready. Where there is no smoke jack, a bottle jack is generally employed as a substitute; and this, when not in use, should be hung on a hook purposely fixed in the wall, with a small hook near it, for the key. A bottle jack should always be used with a tin stand or case, called a hastener, movable, and standing on feet, with a dripping pan fixed in the bottom. This case is open to the fire in front, but closed at the back and sides. It should be of block tin, and should be kept very bright inside, that the rays of heat may be reflected back on the meat. Sometimes the hastener is made to serve also as a plate warmer. When the bottle jack is not used with a hastener, or, at any rate, not fixed to it, there should be a small notched brass crow fixed to the mantel-piece for it to hang upon.

The Coal Cellar should be placed as near to the kitchen as possible, and should be sufficiently large to hold coals for nine months' consumption. There should be a ready access to it from without, for the men to shoot the coals into it.

The Scullery should be as close to the kitchen fireplace as possible. It should be paved with Yorkshire stone or brick work, and need not be more than nine or ten feet high.

In every scullery there should be a stone sink as large as the space will allow, seven to eight inches thick, leaving room for a plate rack at one end. Under the plate rack, or by the side of it, should be a slanting drip board, to convey the water that runs from the plates and dishes into the sink. A waste pipe should be fixed in the bottom of the sink, and taken into the drain, with a bell sink trap and grating over it; or the waste pipe may be taken into a trap in the drain, and the grating soldered into the sink. Under the sink, or in some other convenient part of the floor, should be fixed a large air-tight sink trap, to carry off the water when the floor is cleaned. There should be no sink stone, (a stone pierced with holes to allow the water to run off, but without any cover,) as that is the most frequent means by which noisome smells escape from the drains. Hot water should be supplied to the sink by pipes taken from the cistern into the boiler at the back of the kitchen fireplace, and there coiled round several times; then conveyed to the sink, and afterwards to the washing troughs in the wash house, when they are situated below the level of the cistern: cold water should be also conveyed to the sink, which may be done in pipes direct from the cistern.

The Larder, or safe, for keeping the meat and other provisions in, both before and after they are cooked, should be large, and, indeed, sufficiently capacious to contain all the provisions. It should be effectually protected from the sun's rays, and yet have a complete circulation all round it, if possible: it should be so placed as not to be near the dust bin or beer casks, or any other place from which dust or putrid or other bad smells can arise: it should be enclosed all round with fly wire panels in wood framing, and should be raised above the paving, in order to admit air at bottom, and to keep it dry. The ventilation should be free at top, and be protected from rain by a

double roof; it should be lofty, and should have strong iron bearers, with hooks to slide on them, so that the meat may hang above the head; and shelves, from eighteen inches to two feet wide round, to put dishes on. A separate safe should be provided for vegetables and fruits, and for game, if there is any quantity of it. For large safes, where it can be contrived, there should be an inner door, with a space between the doors, to enable the cook to shut the one before she opens the other. The outer or first portion of the safe may be used for those provisions that will be wanted first. For small families, one or two iron safes, hanging from some beam in the ceiling, contrived so as to be drawn up out of the way by lines and pulleys, when not in use, with one or more shelves in each, and having fly wire all round, are far better than the safes placed against brick walls, as is most usual.

The Cistern.—Over the scullery may be the cistern intended to supply the whole of the basement story with water. This, whether inside or outside of the building, should always be covered over, and have a flap in the cover to give access to the pipes. The best kind of cistern is formed of quartering framed together, with the bottom and sides boarded and lined with lead. The lead at the bottom should, in ordinary cases, be seven to eight pounds weight to the foot, and that at the sides five to six pounds to the foot; but, where the water has a tendency to corrode the lead, (for instance, if at all impregnated with any kind of salt,) the lead should be proportionably thicker. The pipes to supply the cistern, as well as the pipes from the cistern to serve the different sinks, &c., should be of the kind called by the lead merchant extra strong pipe; particularly those pipes that are laid under the ground, and those that are outside the building, and are exposed to the frost in winter. All pipes outside the building should be covered over, to protect them from injury by blows or frost. The cocks should always be of the very best manufacture, or they will be constant sources of annoyance and expense.

The Beer Cellar and the Wine Cellar.—These cellars should not have any communication with each other. Both should be arched and dry, and neither should ever be placed, if it can possibly be avoided, under the yard: if, however, such a situation be inevitable, the cellars should have solid spandrils, and be covered with two or three courses of plain tiles laid in cement. The wine cellar should be fitted up with bins, and, where large enough, divided so as to form an inner and an outer cellar; perhaps the best method of dividing the bins is by walls half a brick thick, and carried up to the top with horizontal York stone shelves every three feet, to divide the bins in their height. As some wines require a warmer temperature than others, the pipes that are to supply the several sinks with hot water, may be carried through some of the bins, or through that portion of the cellar which is separated by a brick wall, and thus a warm cellar may be obtained at a very small expense.

In large, or first rate houses, a butler's pantry, or footman's room, a housekeeper's room, and a servants' hall, are indispensable. These rooms should all have wood floors in the centre, with a course of

stone paving, two feet wide, all round against the walls. The floors should be laid hollow on brickwork, as described for the kitchen, and the skirting should be of cement. An air flue, carried up from the hollow space under the floor, close to the chimney, would be very desirable, to keep up a constant current of air under the floors. The sinks in these rooms (of which there should be two in each, fitted up in a window recess,) should be lined with lead. They should be each about eighteen inches, or two feet, long, and twelve or fifteen inches wide, side by side, and about twelve inches deep; each should be covered with a flap, and have the space beneath it enclosed with doors, to form closets, with a shelf in each. One of the sinks should have a brass grating, about three and a half inches in diameter, soldered into the bottom, with a wood drainer for decanters, &c., and the other a washer and plug with a chain. A waste pipe should be soldered into each sink, but none of these pipes must be taken into the drain without the intervention of some trap, otherwise the foul smells from the drains will be a source of annoyance. Waste pipes of this kind are sometimes allowed to empty themselves into the open area over a sink stone trapped.

The Housekeeper's Room should have a series of closets, two feet deep; some with shelves for linen; others for pickles and preserves; and, again, others with drawers for stores of various kinds.

The Footman's Room, or Butler's Pantry, should have, in addition to the sinks, a large dresser, fitted up with drawers and closets underneath; with a wide shelf continued all along the room, above the level of the top of the door. Adjoining this room should be a fireproof plate closet, ventilated and kept sufficiently warm to prevent it from being in the least damp. The pipes that convey the hot water to the several sinks, may be made to pass round this plate closet, as well as through the wine cellar, as, when damp gains admittance, it causes double trouble to the footman, by tarnishing the plate. The plate closet should be fitted up with shelves, lined with thick drugget.

The Passages should be well lighted and ventilated; otherwise the smells arising from the drains, the kitchen, &c., will be carried up into the body of the house, the air above being more rarefied than that below. The passages should be paved all over with stone or brickwork, with the skirtings of cement, and the walls plastered with stone lime and sand, lined out into blocks, in imitation of stones, and coloured. Plastering of this kind is much more durable than plastering composed of chalk, lime, and dirt, such as is now generally used, and is very little more expense. The bell board should be fixed in the passage between the kitchen and the servants' hall; each bell should have a pendulum attached to the spring, and the names of the rooms written on the bell board below the bells.

Manor Place, Paddington, July 25, 1834.

[*Loud. Arch. Mag.*

¶ *On Ventilation, particularly as applied to Hospitals and Sick Wards. By* J. A Picton, *Esq., Architect.*

The processes of warming and ventilating public buildings are so closely connected in principle, that they ought never to be attempted separately; yet we frequently see large sums of money thrown away in vain struggles to perform what a little attention to the principles of pneumatics would have shown to be impracticable. In churches, chapels, theatres, and other buildings where great numbers are assembled in a small space, the rarefaction of the air proceeds with such rapidity, that little difficulty is experienced in obtaining a circulation sufficient to keep the atmosphere tolerably pure. The greatest art required is in proportioning the apertures for the admission and exit of air to each other, and to the quantity of pure air requisite for the supply of the greatest number the building is capable of containing; and also in so arranging them, that the change of atmosphere may take place without any perceptible draft or current. There is rather an important defect observable in most of the apparatus employed for warming public buildings by heated air, viz: that when the apartment is sufficiently heated, and it is desirable to prevent the temperature rising, there is no mode of immediately effecting this, but by stopping the supply of air entirely, or by opening the windows, so as to admit an unpleasant draft. This might easily be accomplished by connecting a cold air flue with the flue for heated air; having a register for closing it either wholly or partially, so that the temperature of the air admitted might be regulated with the utmost nicety.

The ventilation of hospitals and sick wards, so as to secure a constant and regular change of atmosphere, (whatever may be the difference of temperature within and without the building,) is by no means an easy task. The self-regulating principle, at first sight, appears extremely desirable, as it relieves the attendants of all trouble and responsibility. The mode pointed out by your correspondent, Mr. Milne, is extremely ingenious and elegant; but, in its adaptation to the purposes now under consideration, I am afraid it would fail, from the operation of several causes. In the first place, as it depends for its efficacy entirely on the *excess* of temperature of the air in the room over that without, should the difference be very slight, or the excess be the other way, it would become wholly inoperative. Suppose, for instance, the temperature in the open air to be eighty degrees, and inside the apartment sixty-five or seventy degrees, (no very uncommon case) and the rarefaction produced by respiration equal to ten degrees; it must be evident that the circulation will be extremely languid, if, indeed, it exist at all, and at a time of the year, too, when most needed. In a room of the description I am now speaking of, the rarefaction of the air, by respiration, proceeds comparatively slowly; and it is quite possible for the air in a room to become unfit for respiration with little or no increase of temperature. As the specific gravity of the carbonic acid gas and the nitrogen emitted from the lungs, does not differ materially from that of pure atmospheric air, it is only by affecting the general temperature of the air in the

apartment that the circulation is produced. Another disadvantage attending the plan is, that the delicate balance which is necessary to be preserved would be extremely liable to be deranged in the damp atmosphere of this country, whether the pivots on which the louvre-boards work are of metal or of wood. In high winds, too, the effect of the air externally on the broad surfaces of the louvre-boards would tend greatly to derange their operation. The principal disadvantage of the plan, however, consists in this: its obvious tendency is to preserve a certain relative proportion between the external and internal temperatures; or, in other words, to quicken the circulation when the difference is great, and to diminish it when the difference is small, without reference to the absolute height at which the thermometer may stand: hence it necessarily follows, that if the apertures are calculated to change the air with sufficient rapidity in the heat of summer, when the difference is very slight, they will occasion an enormous waste of heat in the winter, when the difference is very great, by carrying off the air too quickly; or, on the other hand, if calculated for ventilation as required in the winter, they will fail to answer the purpose in the summer. If it be replied that the equilibrium of the dampers can be occasionally altered, so as to require a greater or less pressure on the lower surface to produce the same effects, it is obvious that the great advantage of the self-regulating principle will be entirely lost. I am quite prepared, however, to admit that the principle is an excellent one, and, could the practical defects I have pointed out be avoided, it would be worthy of a trial.

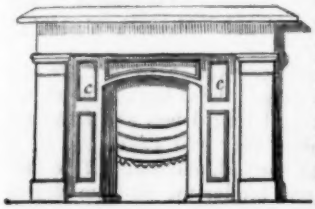
Perhaps the very best method of ventilating any building where it is requisite to produce an artificial current, is by having a fire in a close chamber in the roof or upper part of the building, the only supply of air to which is procured by means of flues communicating with the different wards or rooms to be ventilated. These flues, which might be furnished with registers, or slides, to adjust the ventilation, would cause a constant and regular change of atmosphere under all possible circumstances, and at all seasons of the year. This plan, however, would in all cases be expensive, and in many instances impracticable. Probably the next best mode is to let the air admitted be, as nearly as possible, of the temperature which it is desirable to preserve in the apartment; with a sufficient number of apertures, furnished with slides, in such situations in the upper part of the room as may be most convenient for the exit of the air. When the air in the apartment is warmer than that outside, of course it will have a constant tendency to rise and escape. In the heat of summer, if it is possible to procure a supply of cool air from below ground, and at the same time to heat the air above the room, so as to cause it to rise, it is evident the cooler air will be forced by the atmospheric pressure to supply its place, and a temperature below the average of that outside will be maintained. In a Lock Hospital lately erected by the trustees of the Liverpool Infirmary, designed by myself, and executed under my superintendence, an attempt has been made to combine these advantages, and, hitherto, with complete success. The wards for patients are rooms about fifty feet by twenty, and thirteen feet

six inches high, containing about fifteen or sixteen beds in each. There is no basement story, and the vacant space under each floor communicates with the external air by a number of small gratings. Two air flues in the jambs of each fireplace are open below, and communicate with the back of the grate just above the floor. The grates,

Fig. 1.

of which there are two in each apartment, are registers, with air chambers running completely round the back and sides, but separated in the middle. *Fig.* 1 shows the plan of the grate and jambs, and *Fig.* 2 the front view: *a a* are the flues on each side the fireplace; *b b* the air chambers; and, by a lining of brick inside, the air is made to pass within three inches of the heated back and sides of the grate; *c c* are the slides for the admission of warm air into the apartment. These grates were executed by Messrs. Pooley and Son of Liverpool. It will be seen, by the plan, that none of the heat at the back and sides of the fire is lost; but, being communicated to the air admitted from below, a fine stream of air, warmed, but not heated unpleasantly, is constantly pouring through the orifices into the room. For the escape of the air, there are six flues provided in each ward, about fourteen inches by nine inches each, built in the walls, and opening at the top into the space between the ceiling and the roof, with two apertures to each flue from the room, one at the top near the ceiling, and the other a little above the floor, each furnished with a slide. For the escape of the air from the space under the roof, pagoda caps, formed of concentric rings of cast iron, about two feet in diameter, are fixed, one on the roof of each ward. If it is required to preserve as much heat as possible in the apartment, by closing the whole of the upper slides, the air being able to escape from the bottom apertures only, the whole mass of air in the room must be heated to one temperature before any can be permitted to escape. In like manner, by opening or closing any portion of the slides for the admission or exit of the air, the temperature and ventilation may be regulated at pleasure. In the summer, the air in the space under the slates, being highly rarefied by the direct action of the sun's rays on the upper surface, is continually passing off through the caps; while the air admitted through the apertures *c c*, coming from the subterranean space below the floor, is considerably below the temperature outside. In addition to this, the windows can, of course, be opened when requisite; and, being all on one side of the rooms, and a considerable height from the floor, any unpleasant draft is avoided. Of the efficiency of the above plan, I can speak with the utmost confidence; and its simplicity and cheapness will, I think, be evident on inspection. The warmth diffused by the grates is such,

Fig. 2.



that, though two are fixed in each ward, of the size mentioned above, it has never been found necessary to use more than one at a time.

Liverpool April 18, 1834.

[*Loud. Arch. Mag.*

¶ MANUFACTURE OF VARNISHES.

(Continued from vol. xiv., page 353.)

DIRECTIONS FOR BOILING OIL.

Linseed Oil.

Put twenty-five gallons of linseed oil into an iron, or copper, pot that will hold at least thirty gallons; put a fire under, and gradually increase the heat, so that the oil may only simmer, for two hours; during that time the greatest part of its moisture evaporates; if any scum arises on the surface, skim it off, and put that aside for inferior purposes.

Then increase the fire gradually, and sprinkle in, by a little at a time, three pounds of W. B. scale litharge, three pounds good red lead, and two pounds of Turkey umber, all well dried, and free from moisture; if any moist driers are added, they will cause the oil to tumefy, and, at the same time, darken the oil, and cause it to look opaque and thick, ropy and clammy, and hinder the oil from drying and hardening in proper time; besides, it lies on the working painting like a piece of bladder skin, and is very apt to rise in blisters. As soon as all the driers are added to the oil, keep quietly stirring the driers from the bottom of the pot, otherwise they will burn, which will cause the oil to blacken and thicken before it is boiled enough. Let the fire be so regulated that the oil shall only boil slowly for three hours from the time all the driers were added; if it then ceases to throw up any scum, and emits little or no smoke, it is necessary to have recourse to a few quill tops or feathers. Dip a quill top in the oil every two minutes, for when the oil is boiled enough, the quill top will crackle or curl up quite burnt; if so, draw out the fire immediately, and let the oil remain in the pot at least from ten to twenty-four hours, or longer, if convenient, for the driers settle much sooner when the oil is left to cool in the pot than when it is immediately taken out.

Boiled oil ought always to be kept in casks set on end, or in leaded cisterns screened from the sun; lead cisterns assist its clarification and its drying quality. Keep drying or boiled oil from the air and sun, as it is apt to become viscid or glutinous, or what is termed fat. Good oil, boiled according to these directions, will be pale, thin, limpid, and brilliant; will work and extend freely under the brush or pencil, and will dry glossy and hard without leaving any tack. Some boilers of oil add rosin to their boiled oil, in order to enable them to increase its quantity, and so to undersell the fair dealer; but all oil so adulterated is very pernicious to the colours, as it long retains a soft clamminess, works tough and pasty under the brush or pencil, and lastly, even when dry, its surface blackens, and soon decays,

leaving the work it was intended to preserve to be alternately scorched by the sun, and rotted by the weather.

Poppy Oil

Is extracted from the seeds of the white poppy, and is very sweet and unctuous, and requires a preliminary preparation to render it more drying. As it is less coloured than other oils, it is preferred for delicate kinds of painting, from a notion that delicate colours are not so apt to change, if ground in this oil, in preference to others. I here subjoin two processes for giving a drying quality to oil of poppies.

Into four pints of pure soft water, put two ounces of foreign white copperas; warm the water in a clean copper pan, or glazed earthen jar, until the copperas is dissolved; pour the mixture into a clean glass, or stone, bottle, large enough to contain three gallons; then add to the solution of copperas one gallon and a half of poppy oil; cork and agitate the bottle regularly and smartly for at least two hours; then pour out the contents into a wide earthenware dish; leave it at rest for eight days, when the oil will be clear and brilliant on the surface, and may be taken off with a spoon or flat skimmer, and put up in a glass bottle, and exposed to the light, which in a few weeks renders the oil exceedingly limpid and colourless.

Second Process.—Into four pints of pure soft water put two ounces of white copperas; warm the water as before; pour it into a glass bottle; then add one gallon and a half of poppy oil; one ounce of calcined magnesia, and one ounce of powdered manganese; cork and agitate the bottle smartly for at least two hours; have in readiness a new flannel bag, large enough to hold the contents of the bottle, which is to be emptied into the bag, suspended over a broad earthenware dish, so as to receive the oil and water as it drops from the bag; when the fluid has passed through the bag, the absorbents are to be thrown out, the bag washed and kept until another occasion; the oil and water, after being left at rest for a week, may be separated as before directed, and the oil put up to the light; and the longer it is kept before using, the paler and more drying it becomes.

Nut Oil, or Oil of Walnuts,

Is extracted by expression; and that which is extracted without heat is certainly the most pale, pure, and nutritive seasoning, and retains an exquisite taste of the fruit. That designed for the arts, is of inferior quality, and is plentifully imported to us from France; the heat it undergoes in its torrefaction previous to its expression, disposes it to dry more quickly than that expressed by the cold process; but, at the same time, the heat, though it frees it from its unctuous quality, gives it more colour. When it has been extracted by the cold process, it may be prepared in the same way as directed for the poppy oil.

Trans. Soc. for Encour. of Arts, &c.

On the Essential Oil of Spruce, for the preparation of which, the Silver Medal of the Society for the Encouragement of Arts, &c., was awarded to J. Aylwin, Esq., of Quebec.

The substance called essence of spruce, and employed chiefly in Germany in the preparation of a particular kind of malt liquor called spruce beer, is, properly speaking, an extract. It is made in Canada from two species of pine, the *Canadensis* and *Nigra*, by boiling the young shoots in water, straining the liquor, and then cautiously evaporating it to the consistence of a soft extract, like treacle.

The extract thus prepared contains a certain quantity of turpentine, to which its peculiar flavour is owing; but the essential oil of the turpentine, in which the odour and flavour chiefly reside, is almost entirely driven off, together with the watery vapour, and dissipated in the air during the boiling and evaporation in an open vessel.

Mr. Aylwin, with a view of improving the quality of the extract of spruce which he is in the habit of preparing, substituted a common still and worm tub for the open boiler heretofore used, and thus obtained an extract of better quality than usual, as well as a quantity of essential oil, analogous to the oil of turpentine obtained by the distillation of common turpentine. A small proportion of the essential oil was mixed with the extract, in order to improve its flavour; and it became an object of some importance to discover the most profitable use to which the remainder could be applied.

There was no doubt that it would answer the same purpose as common oil of turpentine; but as the cost of obtaining it is considerable, (from twenty-five to thirty shillings a gallon, according to Mr. Aylwin,) it would be impossible, even under the most favourable circumstances, to afford it at the same price as oil of turpentine.

Some experiments were, therefore, made on its power of dissolving the harder resins, and especially copal, with the view of preparing, by means of it, a varnish more durable, and less coloured, than common copal varnish. It was found that when the boiling hot vapour of this essential oil is brought in contact with copal, the two substances readily unite, and a nearly colourless liquid varnish is the result, which, when spread on the surface of wood, metal, &c., dries speedily and perfectly by the volatilization of the essential oil, leaving the surface covered with a closely adhering layer of, apparently, pure copal.

A specimen of this varnish was sent to the Society, together with some of the essential oil.

The varnish was nearly colourless, and very liquid, but contained too small a proportion of copal, which, added to the very hazardous mode of preparing it, greatly diminished the probability of its usefulness in, at least, this mode of application.

The only very obvious differences between essential oil of spruce and good colourless oil of turpentine, are, that the odour of the latter has some resemblance to that of cajeput oil; and its specific gravity, compared with that of water, is 0.9294, whereas that of oil of

turpentine is, when recently rectified, 0.85, and after a year's exposure to light, 0.96. (See "Tingry on Varnishes," p. 262.)

The light oil of turpentine is incapable of dissolving copal; but that which has become heavy, by exposure for a year to the sun's light, will dissolve it in sufficient proportion to form a varnish. It appeared probable, therefore, that oil of spruce, being heavier than recent oil of turpentine, might also form a varnish with copal. Some was accordingly placed at the disposal of Mr. C. Varley; and the result of that gentleman's experiments is stated in the following letter:—

Sir,—

I have tried the effect of the essential oil of spruce, which the Committee on Chemistry placed in my hands, as a solvent of copal, in comparison with spirits of turpentine, and also with a new liquid from condensed oil gas, which Mr. Faraday favoured me with for that purpose; and the result shows that it is a very good and desirable solvent, for it very nearly equals oil of lavender, (a very expensive oil) and surpasses it in purity, or freedom from colour. Yet alone, it has a very serious defect: it dries so slowly as to require nearly a week to become quite hard, and its solvent power is active enough very soon to soften the paint it is laid on. This would be quite fatal to its use; but by combining alcohol with it, the copal is more perfectly dissolved, making a varnish that soon dries, leaving a glossy surface free from tackiness, though it is not quite hardened till after a day or two; so that, under these circumstances, it is the best article yet produced for making copal varnish. It is heavier than spirits of turpentine; and what it dissolves increasing its density, it more nearly approaches that of the softened portion on which the alcohol has the most effect; and probably it is on that account that they are compatible, for they do not separate. Thus the whole of the copal, though yet ropy, is rendered sufficiently soluble to be used as a varnish; whereas that made by spirit of turpentine and alcohol always separates into two portions, and, if shaken up, appears white and milky, or soapy, showing that they are not compatible, and cannot be used together as a varnish; but when settled, the clear varnish must be poured off: this latter, indeed, is a perfect and excellent varnish, free from colour, and dries quickly; but it leaves the largest portion of the copal behind; and if you use that, it spreads ropy, like slimy leather; and when it feels dry, it will, during a day, rub off like a film of India rubber, showing but little adhesion to the surface; for I must remark, that copal has a tough portion, which requires a year's action of spirits of turpentine only to soften it enough to enable you to stir it. On this portion the alcohol acts, and enables you to obtain as good a varnish in a week as without it would take a year, or otherwise almost continual grinding up, to wash out all the soluble part. And in all cases, the finer the copal is pulverized, the quicker the varnish is made, as the tough portion obstinately fences the soluble part. Heat always quickens the solution, but is injurious, as it almost always developes some colour from colouring matter accidentally in the copal. I therefore prefer time and frequent shaking up, or excessive

grinding, and previously pick out every visible impurity. I apply the alcohol first in just sufficient quantity thoroughly to wet the powder, as it quickly softens the tough part, and afterwards add the other solvent.

The oil from condensed oil gas is also a very powerful solvent of copal, leaving a very soft precipitate instead of any tough portion, and quickly dries, free from tackiness, and appears tough, therefore not liable to crack; but it has a great defect in being so very yellow as to preclude its use in pictures, to which may be added a very disagreeable smell; but if re-distilling, or any other means can be found to free it from colour, or by purer materials to make it without colour, it would be highly valuable as the best solvent of copal. Alcohol is also beneficial, even with this solvent: but as it is, it may probably serve as a very good varnish, or japan, in cases where the colour is no object.

I am, &c. &c.

CORNELIUS VARLEY.

A. AIKIN, *Esq., Secretary, &c. &c.*

P. S. This is accompanied with some specimens of copal in the three solvents, with and without alcohol. [*Ibid.*

Description of the Puncturing Forceps, for which the large Silver Medal was presented to Captain Bagnold, R. N.

January 20th, 1834.

SIR:—

The numerous, and frequently fatal, accidents that happen to the surgical profession from the inoculation of morbific matter in the pursuit of pathological examinations, being too well known to require any demonstration from me, I beg to lay before the Society a new instrument which I have invented for the purpose of preventing such inconvenient and melancholy results. It has been exhibited and used by myself in the presence of several professional gentlemen, who highly approve of it; and I am convinced it will completely prevent the possibility of accident in the most dangerous part of post mortem examinations, viz: the operation of sewing up the body.

The forceps are to be held in the left hand; the lower or projecting jaw pushes back the fat under the skin, and when the instrument is closed, a puncture is made through the integuments. A slight pull by the hand of the operator enlarges the puncture sufficiently to allow the passage of a *blunt needle instead of a pointed one.* The instrument is suffered to expand by means of its spring; and a hold being again taken on the opposite flap of the incision, the ligature is again passed; and the operator may place the stitches within one-eighth of an inch of each other, if he thinks it requisite, without the necessity of once bringing his fingers in contact with the subject, and in half the time that it can be done by the needle as hitherto used. A veterinary surgeon to whom I have shown it, is of opinion that it is admirably

adapted for sewing up incised wounds in horses, and other cattle, whose strength and restlessness render the operation difficult with the usual needle.

I am, &c. &c.

THOS. BAGNOLD.

A. AIKIN, *Esq.*, *Secretary*, *&c.*

In the annexed figure, *a* is the clip, *b* the spring, *c* the lower jaw, with a slit cut at the end of it, as shown at *d*; *e* the upper jaw, the end of which is turned down at right angles, and is made sharp at the end, so as to pierce a hole through the integuments by pressing it through the slit in the lower jaw. *f* is an end view of *e*, showing a groove, or channel, made in it to serve as a guide to the needle. [*Ibid.*

Notice of an improved Lamp Post in use in Edinburgh. *By* JOHN ROBISON, *Esq.*, *Sec. R. S. E.*, *&c.*

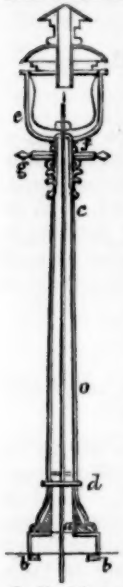
The lamp pillars now in use in this city are, I think, worthy of your notice: they, in the same way as the mile marks, combine durability, effectiveness, and economy with a graceful outline. I had to contend with much prejudice and opposition in getting them introduced; but they have now made their way into some twenty or thirty different places, including New South Wales. Previously to their introduction here, it was held as an axiom that square lanterns were better fitted for gas lights than globes, and that their maintenance was less expensive. Experience has proved both positions to be false, as, by providing, in the construction of the top, a chimney for the discharge of the watery vapour of combustion, it is found that the globes remain undimmed in all weathers, and protect the flame from being blown out when the wind extinguishes that in the lanterns. The expense of repairing damaged lanterns is also found to exceed that of renewing broken globes, in a very unexpected proportion. The lamp pillars serve the purpose of indicating the names of the streets, which are cast in relief on the bar against which the lamplighter's ladder is reared, and are painted white.

The lamp pillar consists of two pieces of cast iron, and a frame of wrought iron for the support of the glass. The annexed figure is a section of this lamp pillar, showing the construction of the parts within.

In erecting the pillar, the base (*a*) is set on the stone by the assistance of a spirit level, and the butts (*b b*) are bedded into the stone, level with the pavement, and secured by lead. The shaft *c c*, (previously adjusted to its base at the foundery,) is then slipped on it, and the key driven through as at *d*, which confines the shaft and the base firmly together.

The lamp iron, or frame, (*e*) is attached to the head of the pillar,

and is secured, upon the same principle, by two screwed pins at *f*. The cross bar (*g*) for the lamplighter's ladder to be placed against, is made flat on the face, and a little thicker below than above, to allow of the light striking on its surface, on which the names of the streets, &c., in which the lamps are to be placed, is to be cast in relief on both sides. The pillars are to be painted of a dark colour, and the letters made white.



The glasses are open at bottom, with an inch and a half aperture as a vent hole; but, in order to prevent the wind from disturbing the flame, a disk of tinned iron slides on the gas pipes to a regulated distance from the opening.

The covers are constructed as shown in the figures having a chimney in the centre, for the purpose of maintaining a current of air through the interior of the lamp, and to carry off the watery vapour generated by the combustion of the gas, which would otherwise condense on the surface of the glass, and obscure the light.

The experience of last winter has shown that this construction of lamp post possesses an important advantage over those previously used here. It throws very little shadow beyond its own base; the lights burn steadily in the most stormy weather; the casualties to the glass have been much diminished; and the difficulty of climbing the pillar (from the absence of projecting ornaments) has put a stop to the stealing of the brass-work in the burners. The dust, likewise, from finding no lodgment, is washed away by every shower.

Edinburgh, February, 1833. [*Loud. Arch. Mag.*

List of American Patents which issued in June, 1835.

		June
311.	*Thrashing machine.*—William Laighton, Portsmouth, N. H.	6
312.	*Measuring distances.*—Samuel Stone, Long Green, Baltimore co., Md.	6
313.	*Gold extracting machine.*—Nathaniel Bosworth, city of Philadelphia,	6
314.	*Coffins from cement.*—D. Dayton & J. White, Salina, N. Y.	6
315.	*Truss for hernia.*—John Heintzelman, city of Philadelpnia,	6
316.	*Stove, pyramidal.*—Thomas M. Southwick, Troy, N. Y.	6
317.	*Hoisting brick, &c.*—Jesse Rinehart, Danville, Illinois,	6
318.	*Hulling clover, &c.*—W. Braley, and J. Walker, Somerset co., Md.	6
319.	*Thrashing machine.*—H. Edgar, and J. W. Edgar, Wayne co., Ohio,	6
320.	*Cooking stove.*—Elijah Skinner, Sandwich, N. H.	12
321.	*Fireplace.*—J. A. Bean, and E. Skinner, Sandwich, N. H.	12
322.	*Thrashing machine.*—T. Rucker, Jr., assignee of P. Cheeks, Murfreesboro, Tenn.	12

		June
323.	*Platform balance.*—Alexander Bliss, Benson, Vermont,	12
324.	*Bridges.*—George Law, Easton, Penn.	12
325.	*Cheese press.*—David Phelps, Bangor, Maine,	12
326.	*Fireplaces.*—Joseph Snyder, city of Philadelphia,	12
327.	*Stoves.*—John C. Parry, Pittsburg, Penn.	12
328.	*Saw set.*—Herrick Aiken, Middlesex, Mass.	12
329.	*Splitting leather.*—Herrick Aikin, Middlesex, Mass.	12
330.	*Pumps, fire engines, &c.*—Henry Gates, Northampton, Mass.	12
331.	*Warming buildings.*—Robert Rogers, South Berwick, Maine,	12
332.	*Raising water.*—David W. Hunt, Newburyport, Mass.	12
333.	*Mortising machine.*—Jonathan Page, Henniker, N. H.	12
334.	*Oven.*—Samuel Pollard, Bucksport, Maine,	12
335.	*Shaving staves, &c.*—John Everhart, Wayne, Warren county, Ohio,	12
336.	*Shelling and grinding corn.*—G. M. Weaver, Montgomery Square, Pa.	12
337.	*Hames.*—Sereno Norton, East Bloomfield, New York,	12
338.	*Saddles, spring seat.*—J. G. Palmer, H. & A. Beard, Greenville, Va.	12
339.	*Propelling by weights.*—Elisha Turner, Pownal, Maine,	12
340.	*Refrigerator.*—John Waring, Port Tobago, Va.	12
341.	*Hoisting machine.*—Barnabas Pike, city of New York,	12
342.	*Friction wheels.*—Julien Nicolet, Pittsburgh, Penn.	12
343.	*Bee house.*—William Groves, Harrisburg, Penn.	12
344.	*Shingle machine.*—Samuel B. Chapman, Camden, N. J.	15
345.	*Winnowing machine.*—Jeremiah Nicols, Kent county, Md.	15
346.	*Mortising and tenoning.*—Joseph H. Darby, Leominster, Mass.	15
347.	*Washing machine.*—Charles Otis, Finksburg, Maryland,	15
348.	*Auger.*—William Jones, Portsmouth, Virginia,	15
349.	*Paper ruling machine.*—James C. Teasdale, Dansville, New York,	15
350.	*Sausage meat, cutting.*—A. and J. Keagy, Morrison Cove, Pa.	15
351.	*Undershot wheel.*—Ebenezer Cochran, Princeton, Indiana,	15
352.	*Spinner, accelerating.*—Leonard Norcross, Dixfield, Maine,	15
353.	*Stumps, removing.*—Leonard Norcross, Dixfield, Maine,	15
354.	*Cotton, thinning.*—Jordan Gatling, Murfreesborough, N. C.	19
355.	*Hulling clover seed.*—John P. Ridings, Hillsborough, Ohio,	19
356.	*Bellows for forges, &c.*—John C. Concklin, Peekskill, N. Y.	19
357.	*Boot cramp.*—Nathan Ayer, St. Johnsbury, Vt.	19
358.	*Check plates for banks, &c.*—Charles C. Wright, city of New York,	19
359.	*Brick machine.*—T. Miles Bannister, Phelps, New York,	19
360.	*Steam engine piston.*—B. Wright, and G. Ketchum, Calhoun co., M. T.	19
361.	*Mortise lock.*—John G. Hotchkins, New Haven, Conn.	19
362.	*Boiler pipes, fixing.*—John Goulding, Dedham, Mass.	19
363.	*Skins, softening.*—Eli Kendall, Ashby, Mass.	19
364.	*Boilers, culinary.*—Anson W. Spencer, Cazenovia, New York,	19
365.	*Mowing machine.*—J. Sturdevant, and J. Holmes, Portland, Me.	19
366.	*Cotton planting.*—Jordan Gatling, Murfreesborough, N. C.	20
367.	*Smut mill.*—John Card, Genesee county, N. Y.	20
368.	*Stove.*—James Atwater, New Haven, Conn.	20
369.	*Mortar mixing.*—J. Everhart, and L. Swimley, Washington, D. C.	20
370.	*Pressing brick.*—William Wadsworth, Hartford, Conn.	26
371.	*Cooking stoves.*—Le Grand Fairman, Orleans county, New York,	26
372.	*Ovens and stoves, heating.*—Charles Vale, Newark, N. J.	26
373.	*Cutting straw, &c.*—J. M'Math, Crawford county, Penn.	26
374.	*Trees, felling.*—James Hamilton, city of New York,	26
375.	*Shelling corn.*—J. V. Dunbar, and A. Powers, Portland, Maine,	26
376.	*Cooking stove.*—T. D. Burrall, Geneva, New York,	26
377.	*Napping machine.*—Reuben Daniels, Woodstock, Vt.	26
378.	*Rotary steam engine.*—Orson Barnes, Van Buren, N. Y.	26

CELESTIAL PHENOMENA, FOR SEPTEMBER, 1835.

Calculated by S. C. Walker.

Day.	H'r.	Min.					
7	7	5	Im.	2 Piscium,	,4,6,	N. 55°	V. 5°
7	7	37	Em.			359°	310°
12	13	55	Im.	34 Tauri,	,7,	161°	112°
12	14	58	Em.			255°	216°
28	8	12	Im.	*g* Sagittarii,	,5,6,	62°	90°
28	9	15	Em.			306°	345°

Meteorological Observations for May, 1835.

Moon.	Days.	Therm. Sun rise.	Therm. 2 P.M.	Barometer. Sun rise.	Barometer. 2 P.M.	Wind. Direction.	Wind. Force.	Water fallen in rain.	State of the weather, and Remarks.
				Inches	Inches			Inches.	
☾	1	48°	60°	29.80	29.80	NE.	Moderate.		Clear day.
	2	46	64	.80	.84	NW.	do.		Clear day.
	3	55	66	.03	30.00	W.	Calm.		Clear—lightly cloudy.
	4	57	70	.86	29.70	SE. S.	Moderate.	0.03	Fog—hazy—rain in night.
	5	52	72	.65	.66	SE. S.	do.		Cloudy day.
	6	48	65	.76	.76	E. SW.	do.		Cloudy day.
	7	47	67	.90	.90	NE. SW.	Breeze.		Lightly cloudy.
	8	52	59	.70	.65	SW.	do.		Cloudy—showery.
	9	45	49	.75	.75	SE.	Moderate.	0.31	Rain—cloudy.
	10	40	53	.70	.70	NE.	do.		Cloudy—flying clouds.
	11	44	60	.85	.66	W.	do.		Clear day.
	12	46	71	.90	.86	W.	do.		Lightly cloudy—clear.
⊕	13	48	71	.86	.90	SE.	do.		Clear—rain in the night.
	14	47	55	.70	.53	SE.	do.	1.25	Rain—cloudy.
	15	43	58	.53	.55	N.	Blustering		Cloudy—flying clouds.
	16	41	60	.60	.60	W.	do.		Clear—flying clouds.
	17	46	72	.75	.83	W.	do.		Clear day.
	18	55	80	.86	.90	SW.	Brisk.		Lightly cloudy—clear.
	19	61	84	.90	.90	SW.	do.		Lightly cloudy—clear.
	20	63	84	.90	.83	SW. E.	do.	0.75	Clear—shower in ev'g. thunder &
	21	60	65	.80	30.05	E.	do.	0.03	Clear—cloudy—rain. [light'g.
	22	56	68	30.00	.30	SW.	do.		Cloudy—clear.
	23	44	64	.30	.20	SW.	do.		Clear day.
	24	53	68	.30	29.85	SW.	do.		Lightly cloudy—clear.
☽	25	53	80	29.80	.76	W.	Moderate.		Cloudy—clear.
	26	62	82	.76	.80	E.	do.	0.12	Cloudy—rain.
	27	64	83	.80	.83	SE.	do.		Cloudy day.
	28	54	83	.83	.83	SW.	do.	0.03	Cloudy—flying clouds—rain.
	29	65	78	.65	.69	W.	do.		Cloudy—flying clouds.
	30	62	75	.63	.73	W.	do.		Clear—flying clouds.
⊗	31	63	82	.90	.85	W.	do.		
	Mean	52.32	69.06	29.78	29.81			2.54	

Thermometer.

Maximum height during the month, 84. on 19th & 20th.
Minimum do. . 40. on 10th.
Mean do. . 60.64 .

Barometer.

30.30 on 23d & 24th.
29.3 on 3d.
29.79